

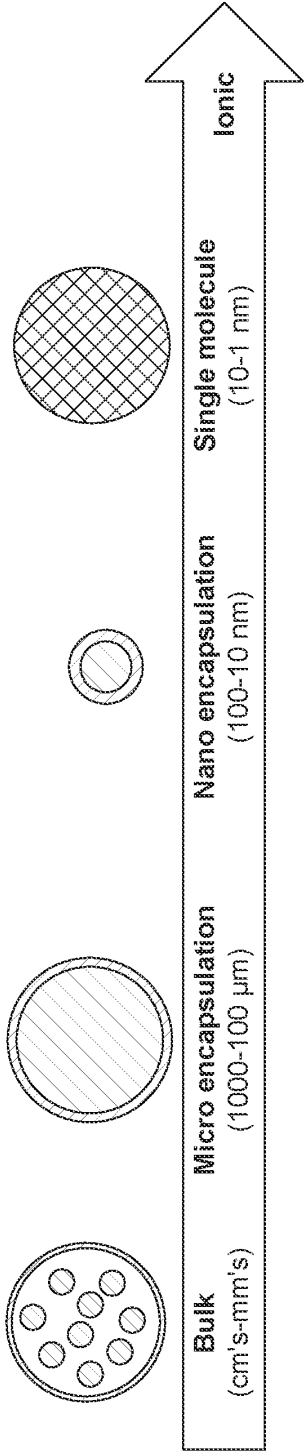


FIG. 1

|                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                      |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <div>Sample Extraction</div> <div><ul style="list-style-type: none"><li>Enzymes</li><li>Salt</li><li>Surfactants</li><li>Buffering agents</li></ul></div> <div>pH 7.5</div> <div>Reaction volume:<br/>~1-5 mL</div> | <div>Library Preparation</div> <div><ul style="list-style-type: none"><li>Enzyme inhibitors</li><li>Salts</li><li>Primers</li><li>Enzymes</li><li>Nucleotides</li><li>Organic osmolites</li><li>Magnetic beads</li></ul></div> <div>pH 7</div> <div>Reaction volume:<br/>~0.05 mL</div> | <div>Enrichment</div> <div><ul style="list-style-type: none"><li>Nucleotide Molecular probes</li><li>Enzymes</li><li>Magnetic beads</li><li>Crowding agents</li></ul></div> <div>pH 8.5</div> <div>Reaction volume:<br/>~0.1-0.2 mL</div> | <div>Clustering</div> <div><ul style="list-style-type: none"><li>Salts</li><li>Enzymes</li><li>Nucleotides</li><li>Nucleotide Small molecules</li><li>Surfactants</li><li>Primers</li></ul></div> <div>pH 8.6</div> <div>Reaction volume:<br/>~1 mL</div> | <div>Sequencing</div> <div><ul style="list-style-type: none"><li>Labelled-Nucleotides</li><li>Surfactants</li><li>Salts</li><li>Enzyme Small molecules</li></ul></div> <div>pH 7-10</div> <div>Reaction volume:<br/>~30-100 mL</div> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

FIG. 2A

FIG. 2B

FIG. 2C

FIG. 2D

FIG. 2E

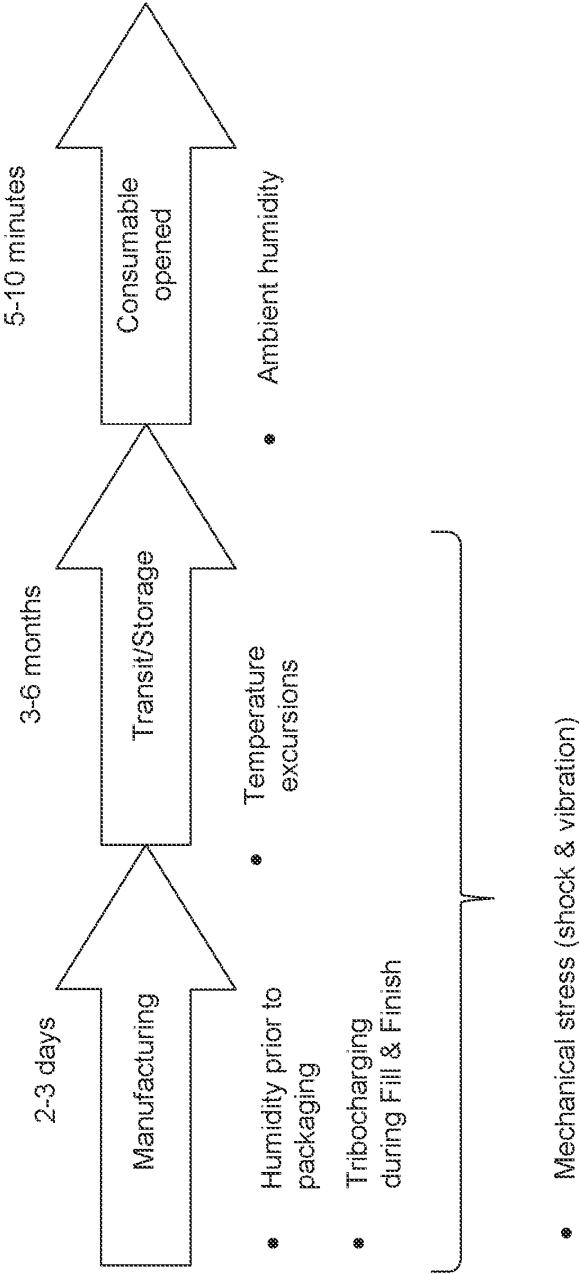
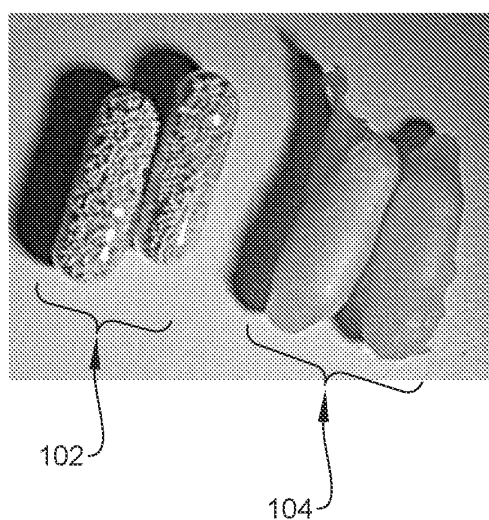


FIG. 3



Blue 102: OTS Gelatin capsule  
filled with microspheres

Yellow 104: OTS Gelatin capsule  
filled with microspheres quick dipped  
in hot paraffin wax

FIG. 4A

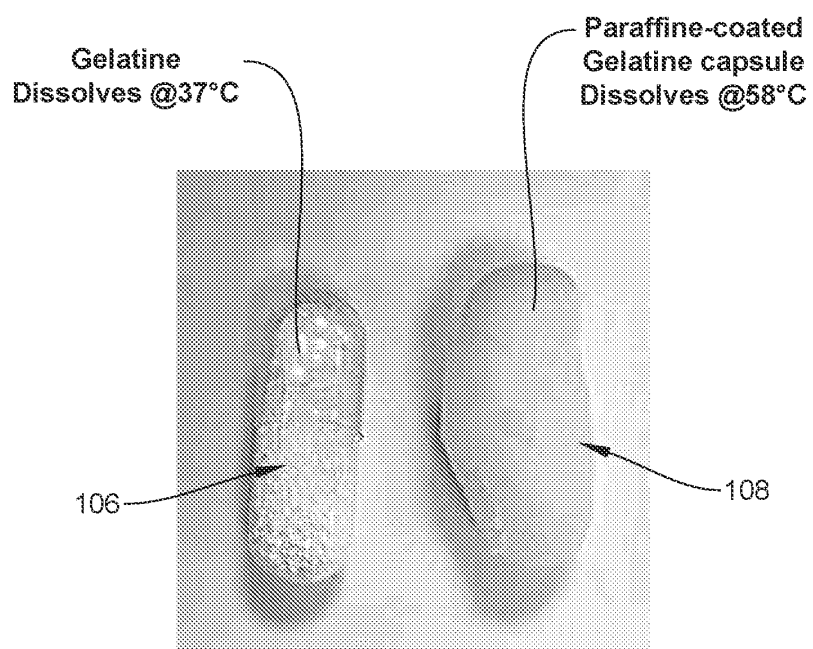


FIG. 4B

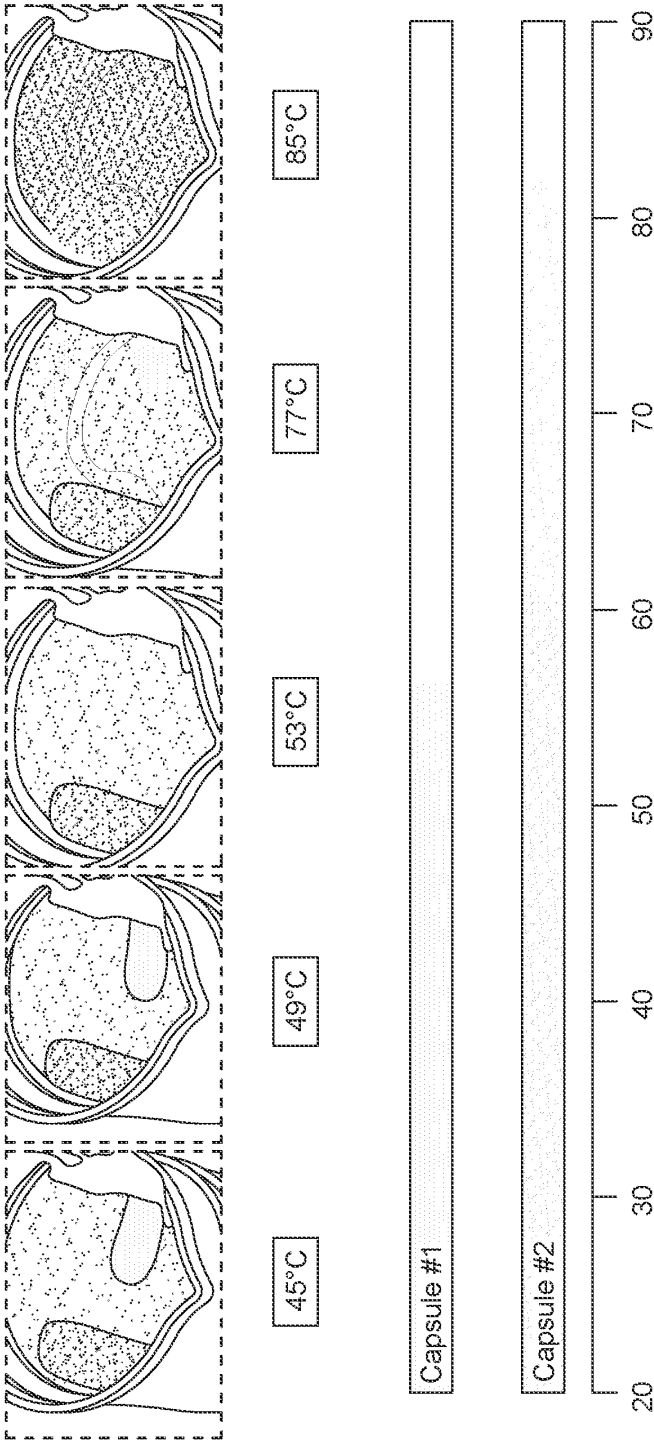


FIG. 5

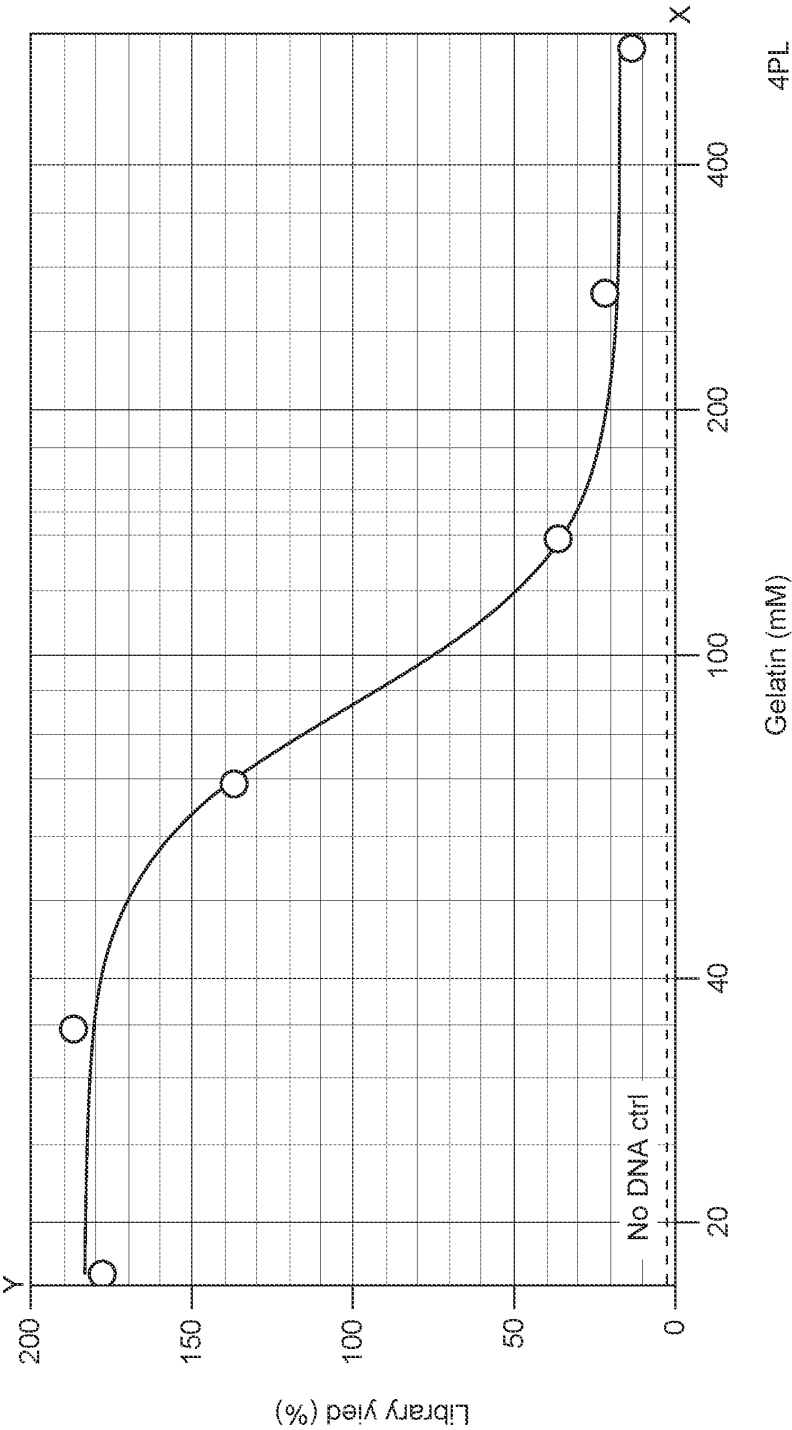


FIG. 6

|                   | % excipient | Rehydration time (min) |
|-------------------|-------------|------------------------|
| Trehalose         | 5-40        | <1                     |
| Carrageenan       | 0.125-1     | <1                     |
| Gelatin           | 1.25-10     | >60                    |
| Phenylalanine/Tre | 1/4-2/8     | 5.5- >60               |
| Leucine/Tre       | 1/4-2/8     | 1- >30                 |
| Isoleucine/Tre    | 1/4-2/8     | 1-15                   |

FIG. 7A

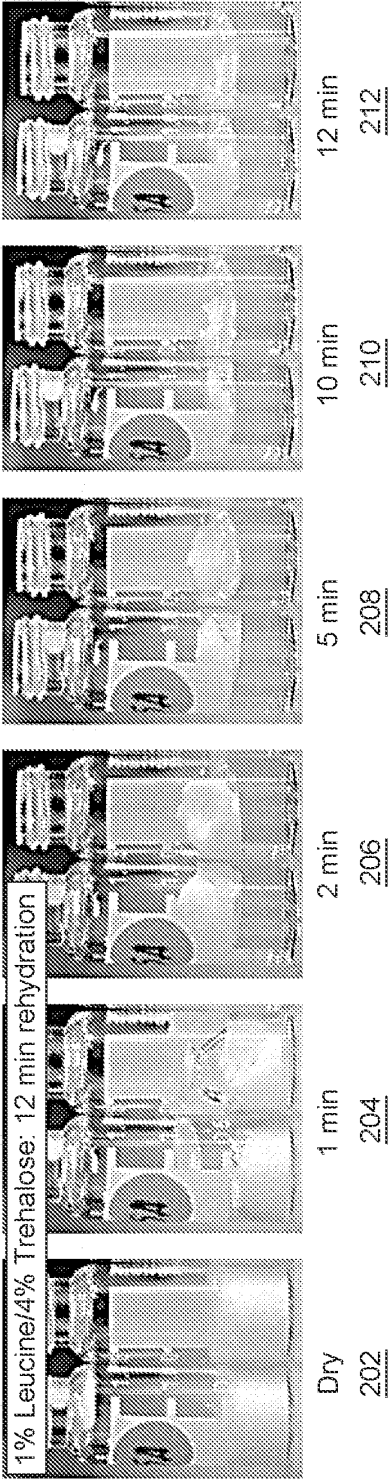


FIG. 7B

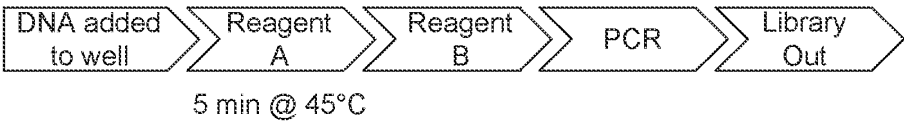


FIG. 8A

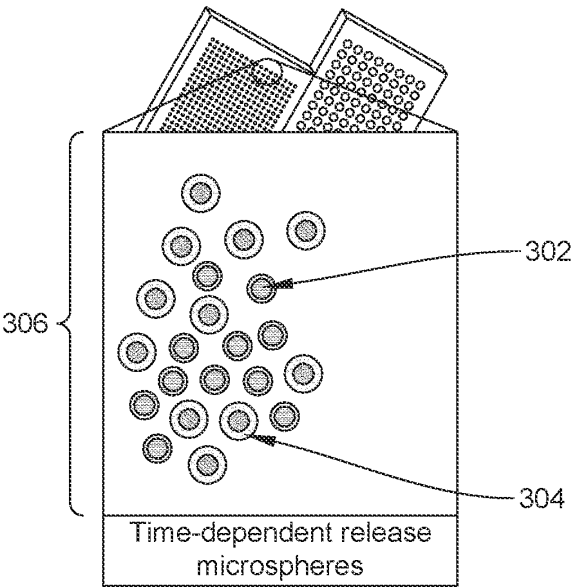


FIG. 8B

| Reagent | Active reagent volume (μL) | Number of ϕ600μm μSpheres | Active reagent composition                                                                                                                                             | Encapsulation shell composition | Encapsulation shell release trigger |
|---------|----------------------------|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|-------------------------------------|
| A       | 40                         | 354                       | <ul style="list-style-type: none"><li>• BLT</li><li>• Tris pH7</li><li>• MgCl<sub>2</sub></li><li>• Indexed primers</li><li>• Q5 polymerase</li><li>• Bst3.0</li></ul> | N/A                             | -                                   |
| B       | 10                         | 89                        | <ul style="list-style-type: none"><li>• Tris pH9</li><li>• dNTPs</li><li>• NaCl</li><li>• betaine</li></ul>                                                            | Gelatin or carrageenan          | Time                                |
| B'      | 10                         | 89                        | <ul style="list-style-type: none"><li>• Tris pH9</li><li>• dNTPs</li><li>• NaCl</li><li>• betaine</li></ul>                                                            | Pectin or Carrageenan or Waxes  | Temperature                         |

FIG. 8C

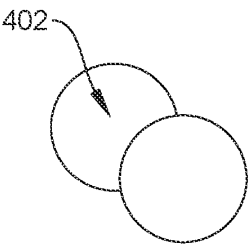


FIG. 9A

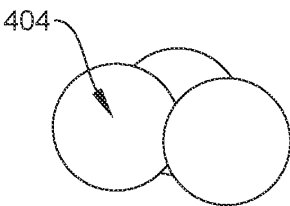


FIG. 9B

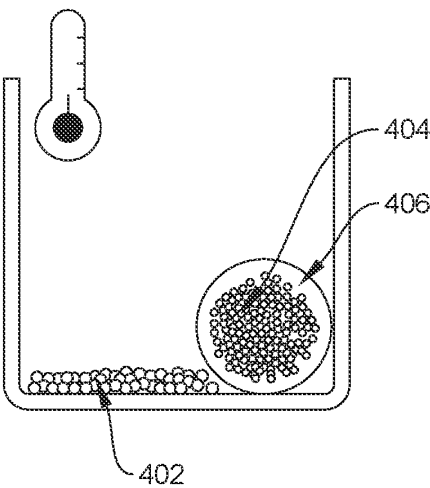


FIG. 9C

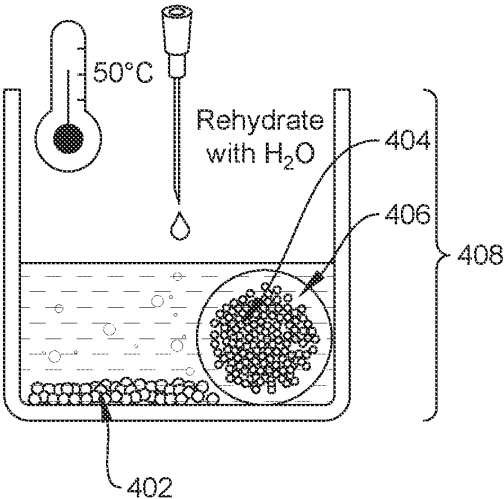


FIG. 9D

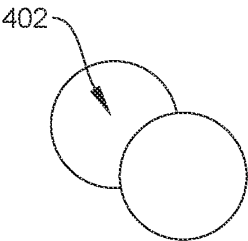


FIG. 10A

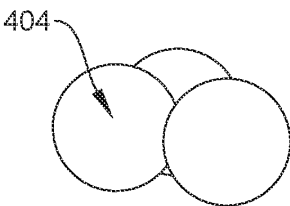


FIG. 10B

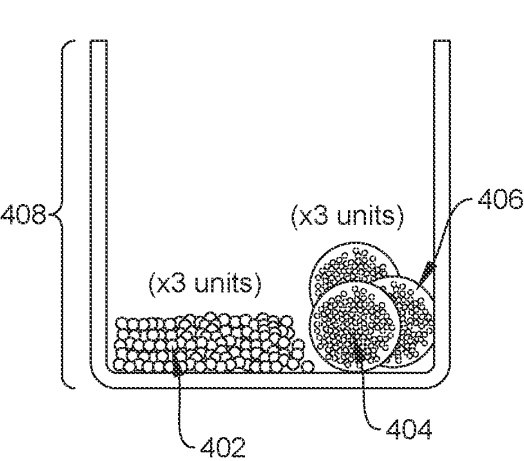


FIG. 10C

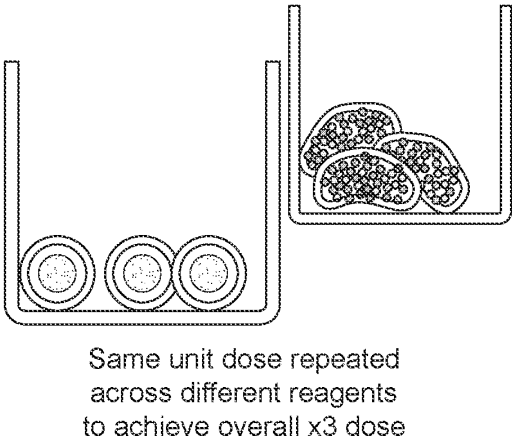


FIG. 10D

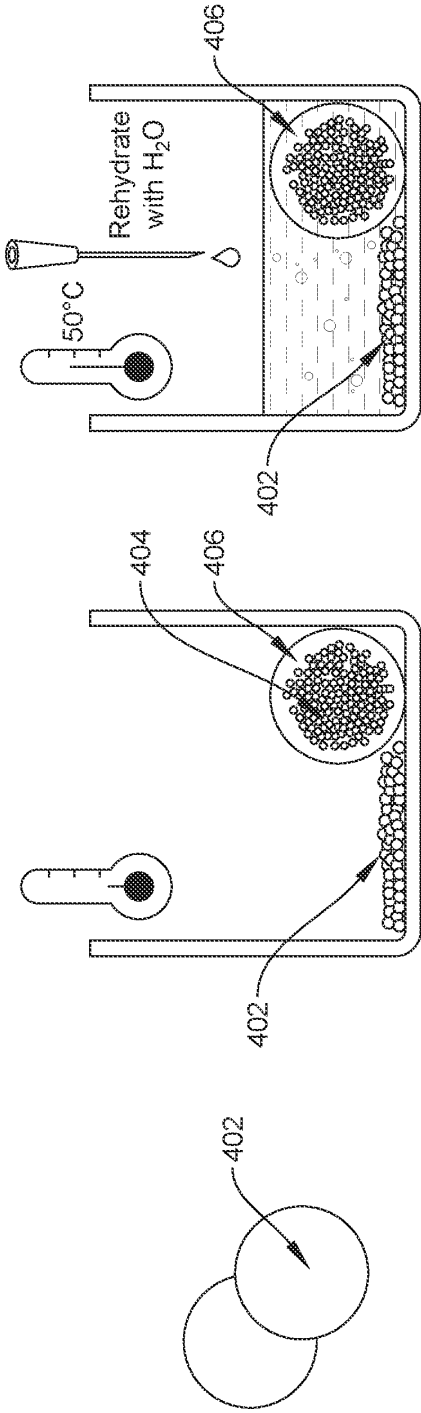


FIG. 11A

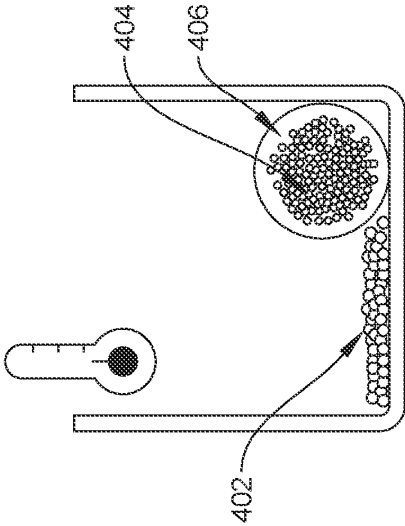


FIG. 11B

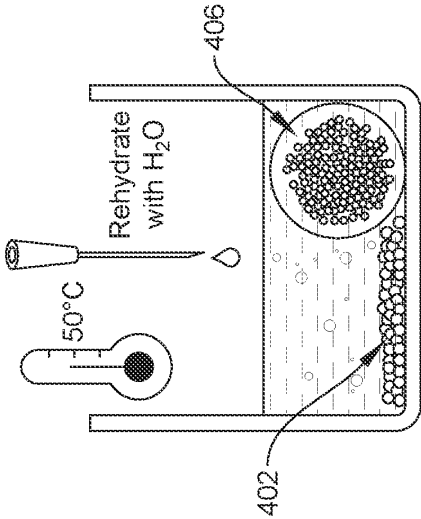


FIG. 11C

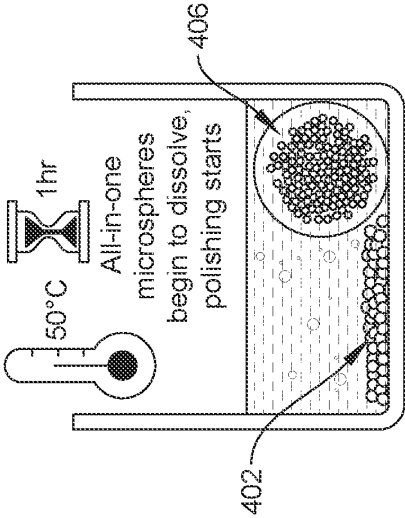


FIG. 11D

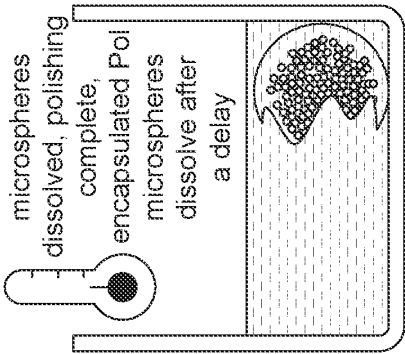


FIG. 11E

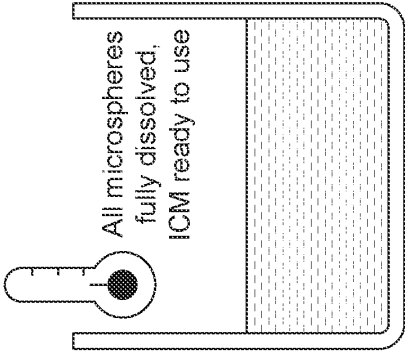


FIG. 11F

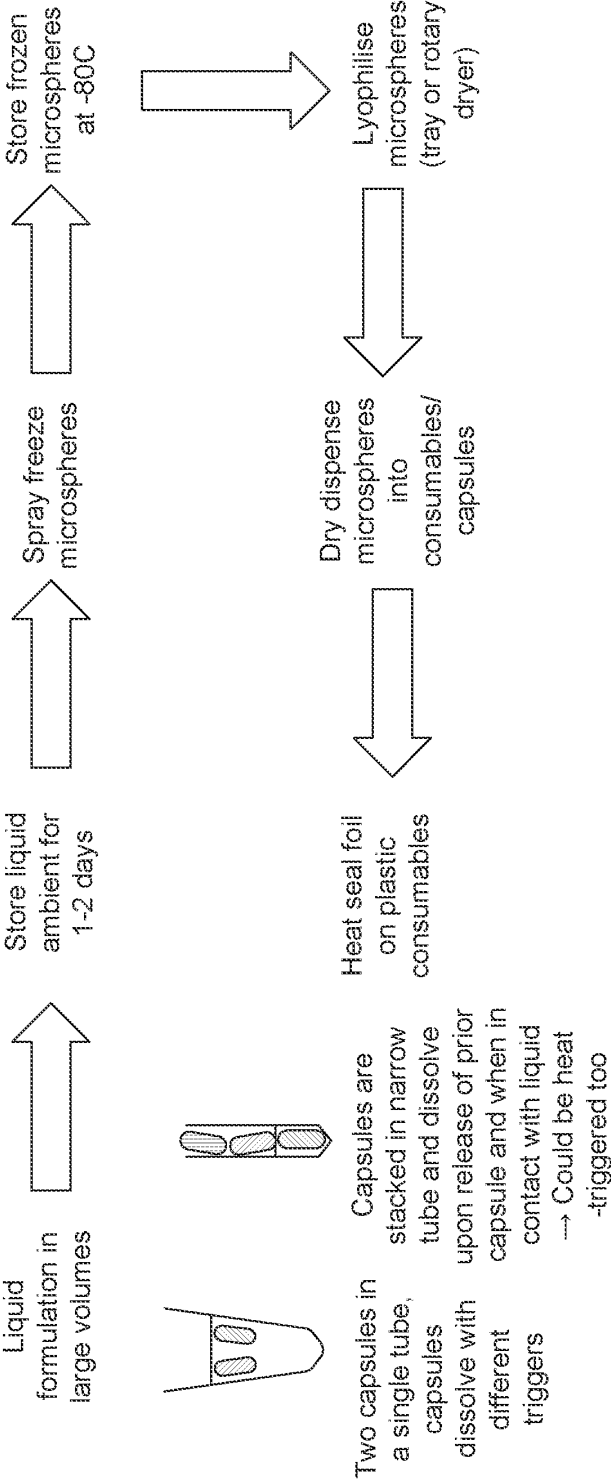


FIG. 12

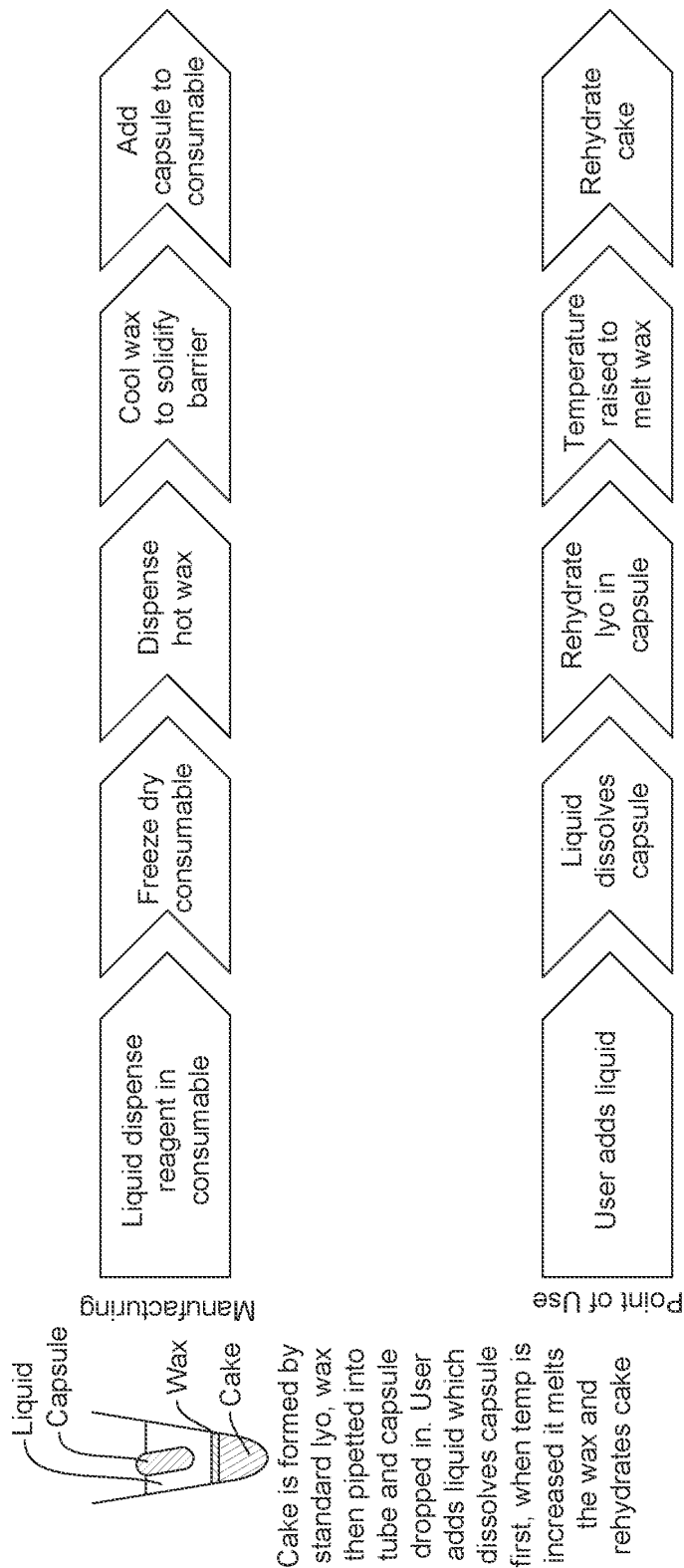


FIG. 13

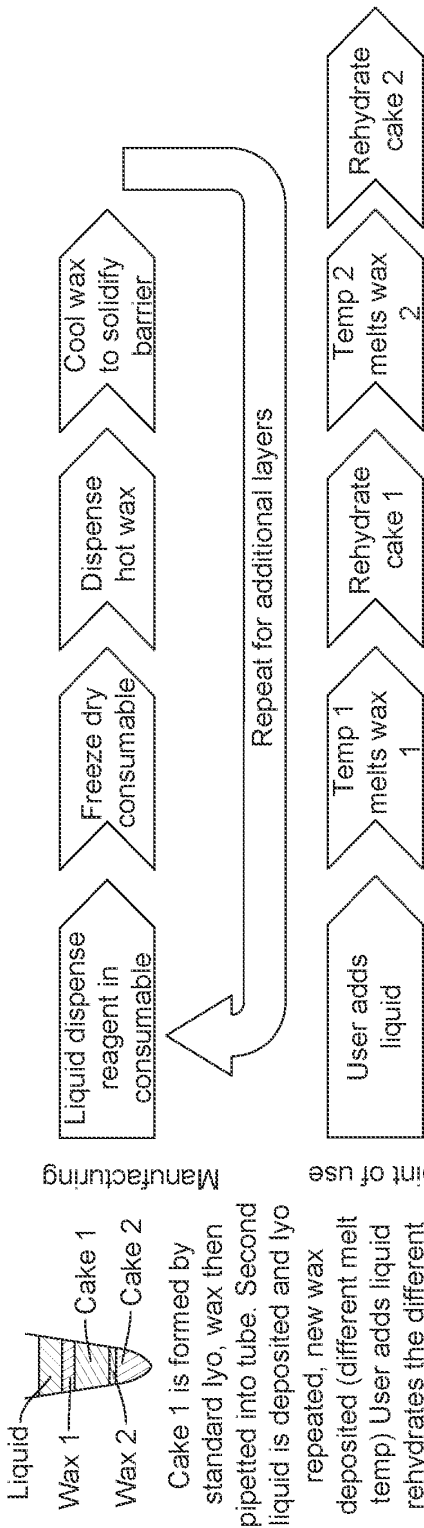


FIG. 14A

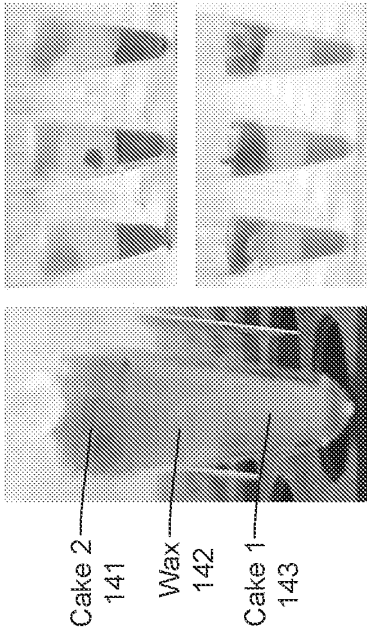


FIG. 14B

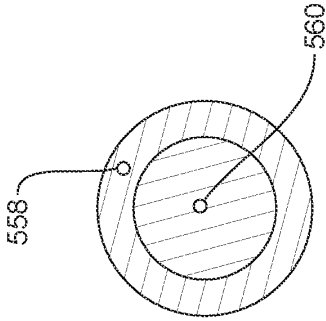


FIG. 15C

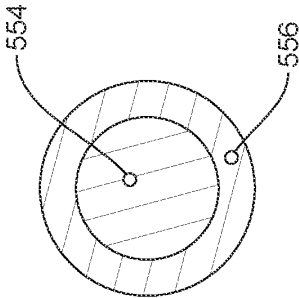


FIG. 15B

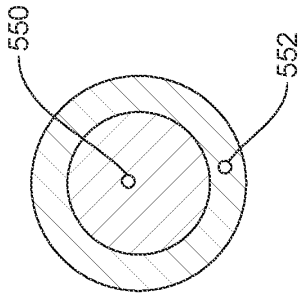


FIG. 15A

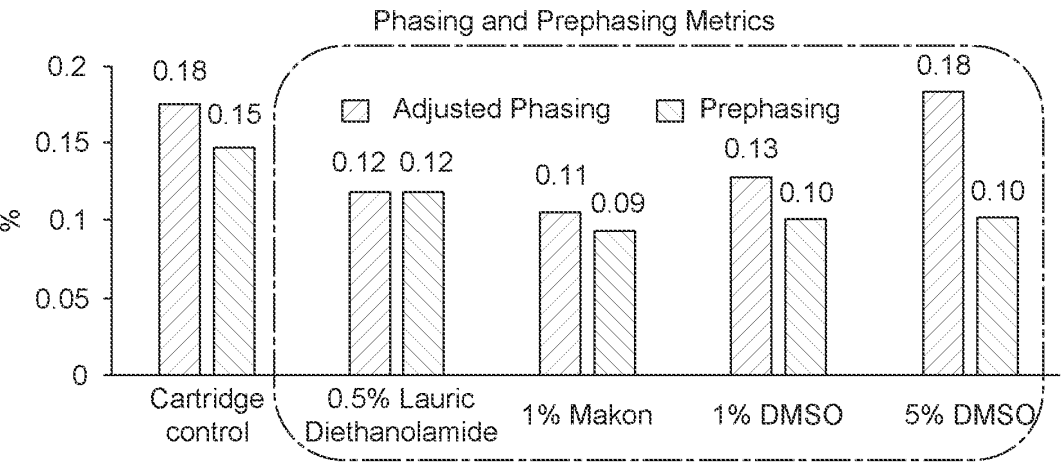


FIG. 16A

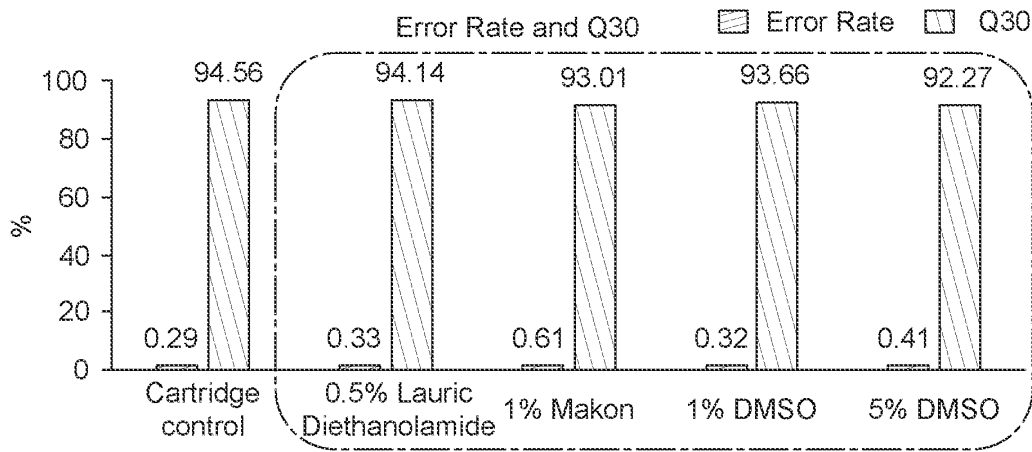


FIG. 16B

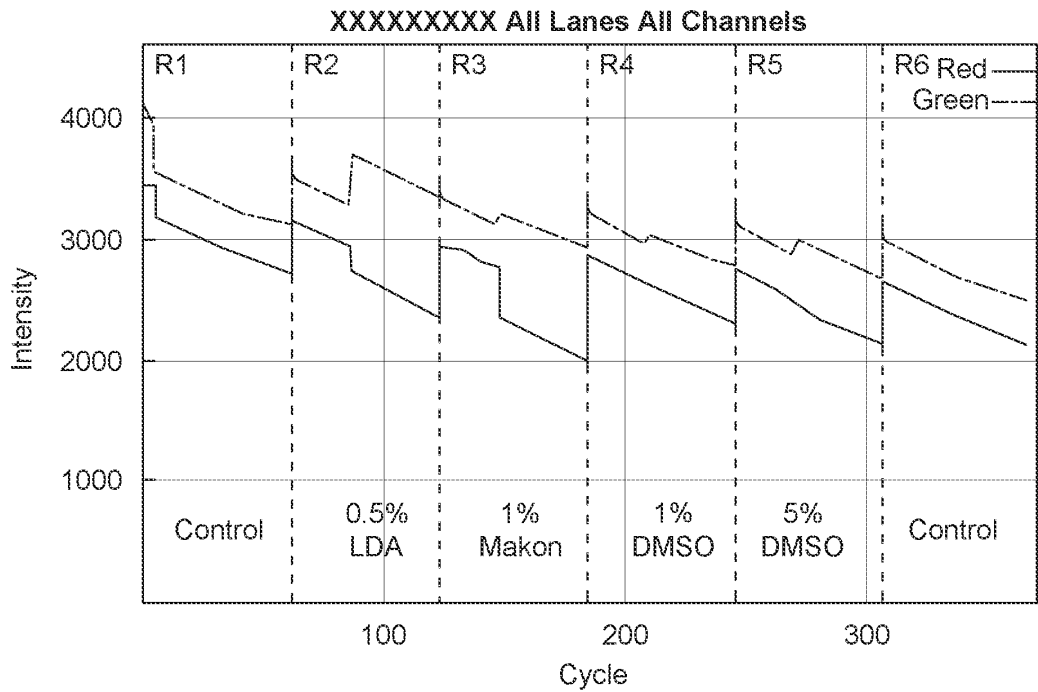


FIG. 16C

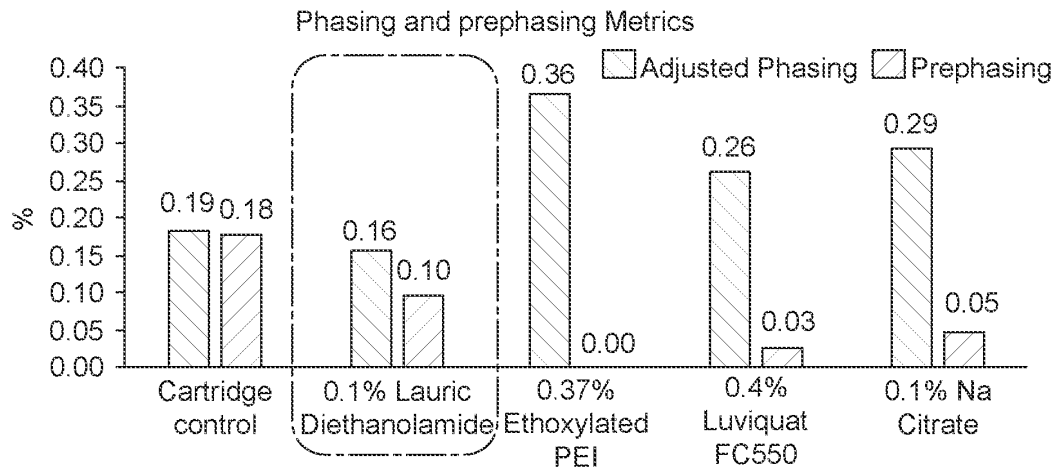


FIG. 16D

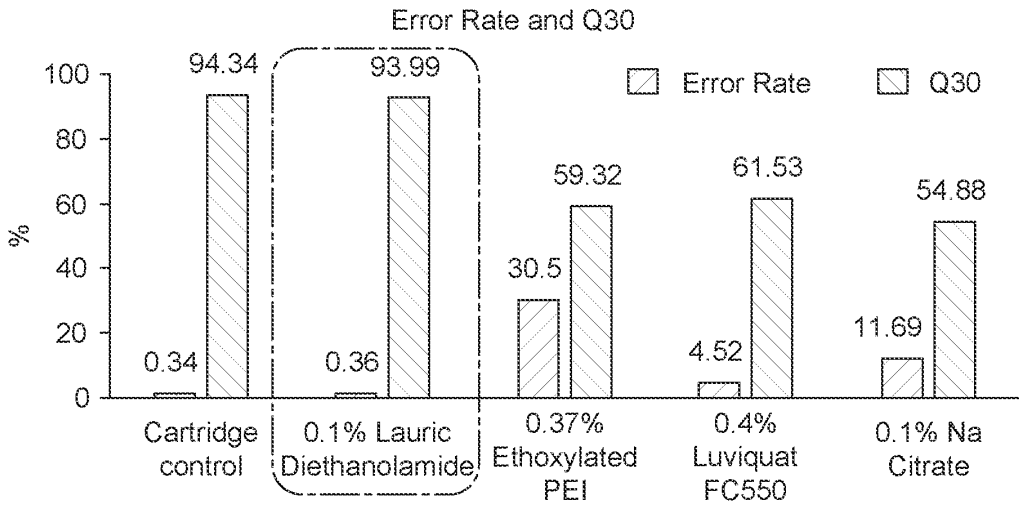


FIG. 16E

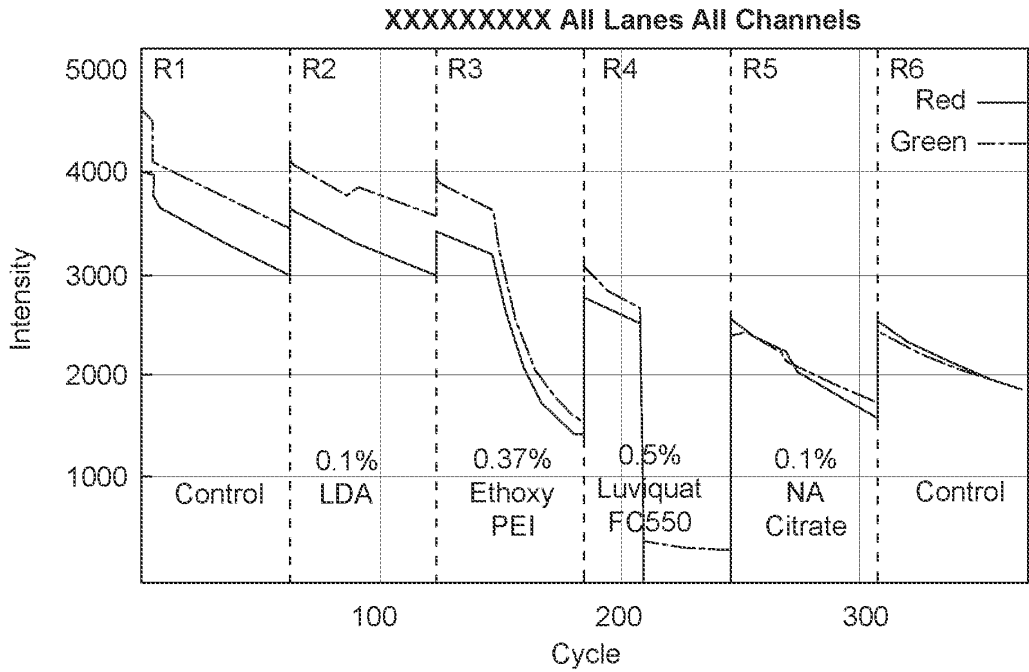


FIG. 16F

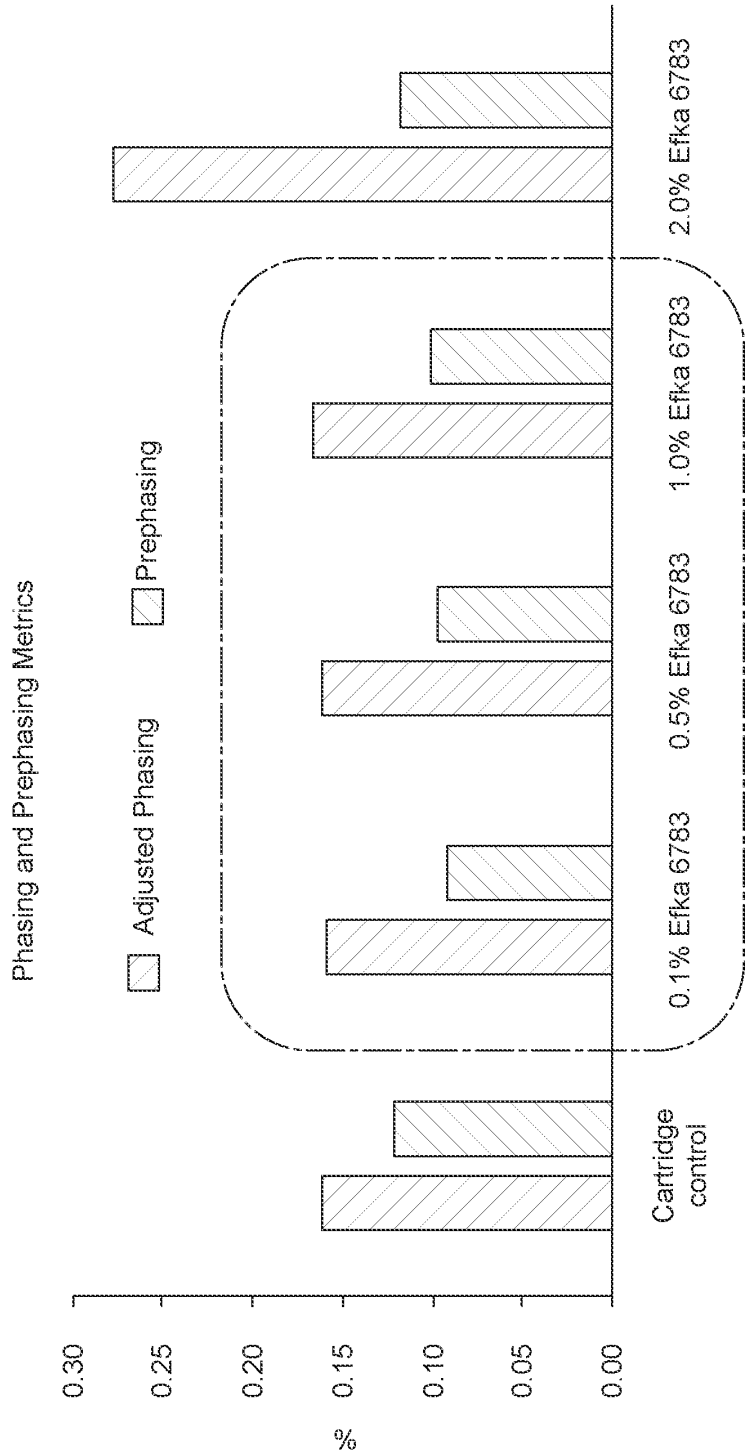


FIG. 16G

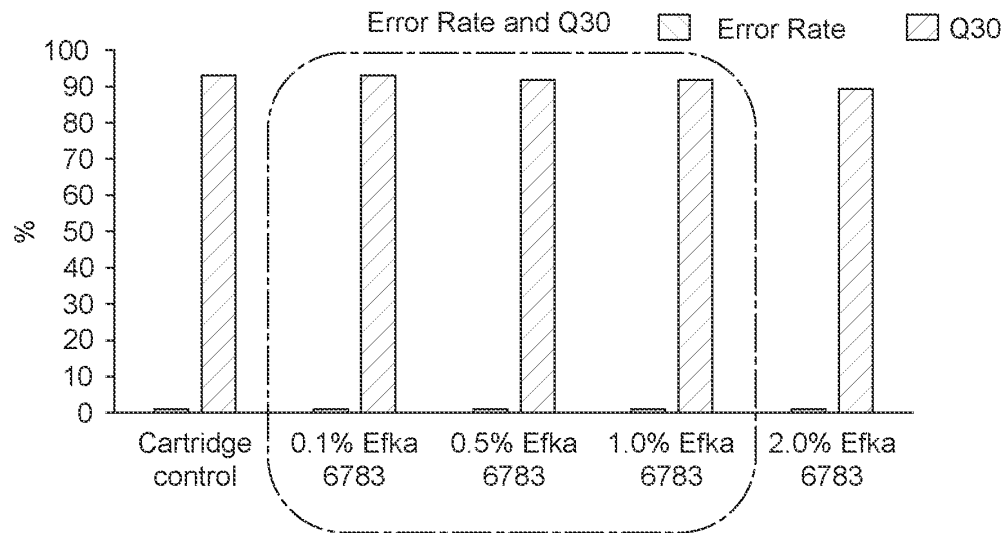


FIG. 16H

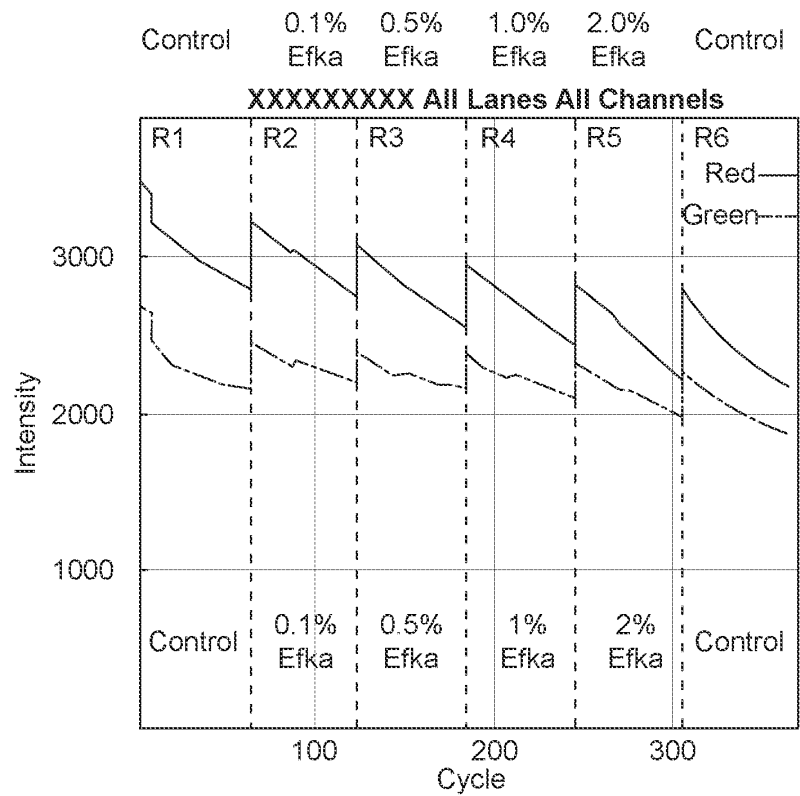


FIG. 16I

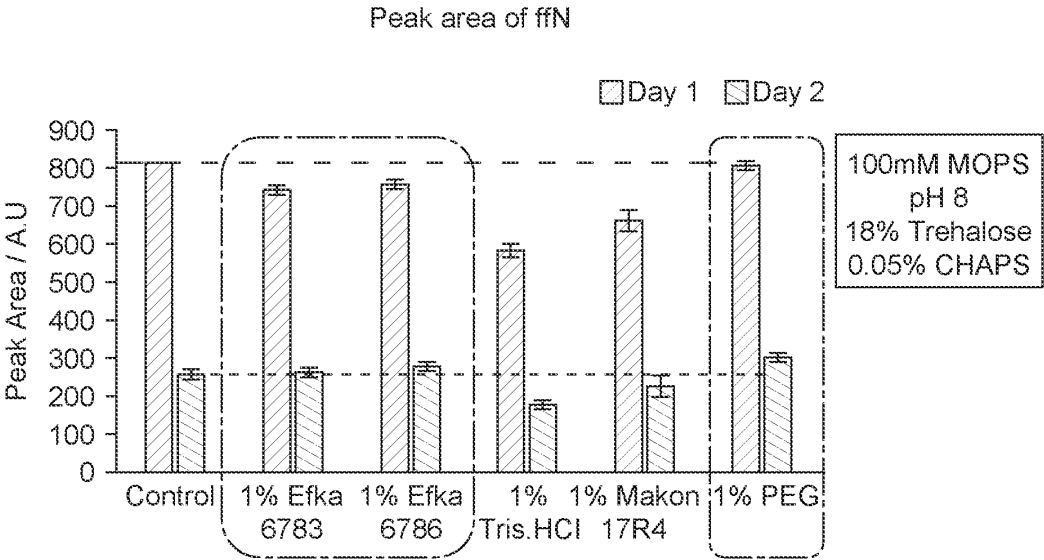


FIG. 17A

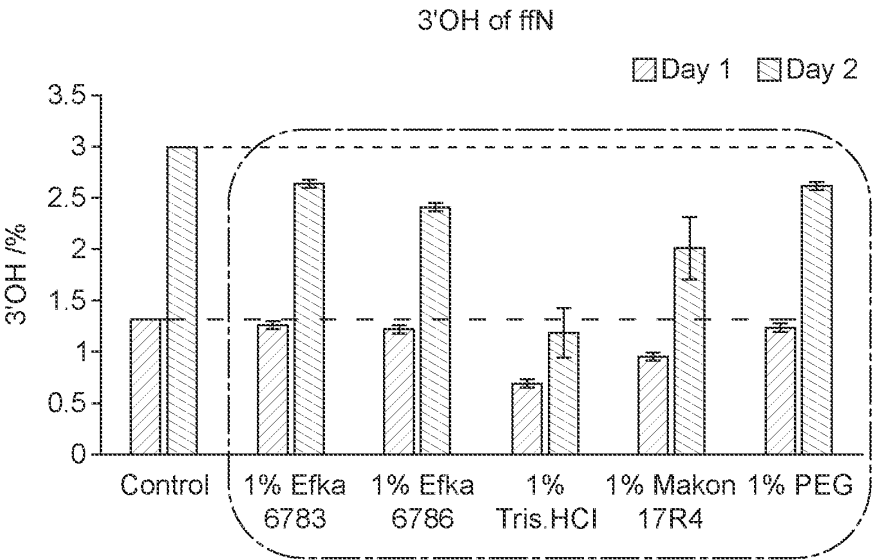


FIG. 17B

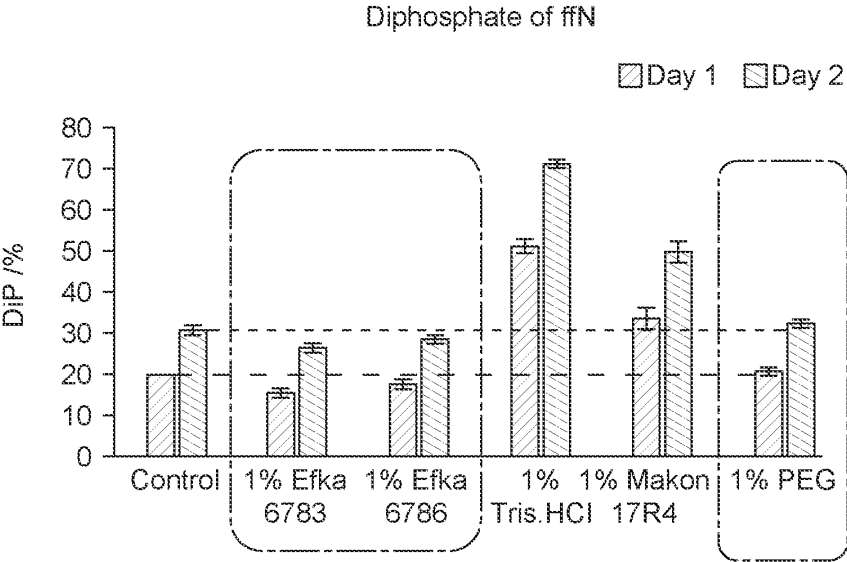


FIG. 17C

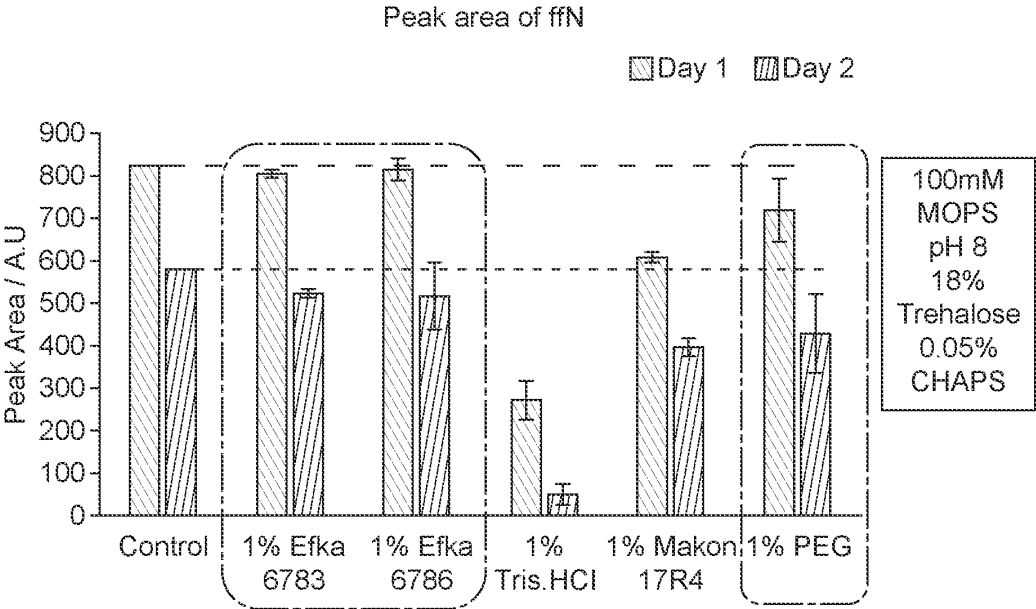


FIG. 17D

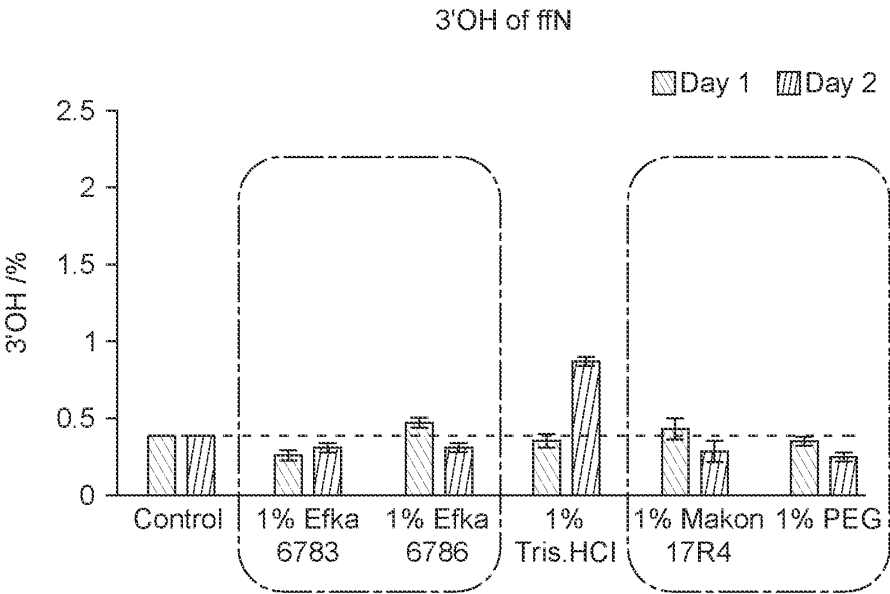


FIG. 17E

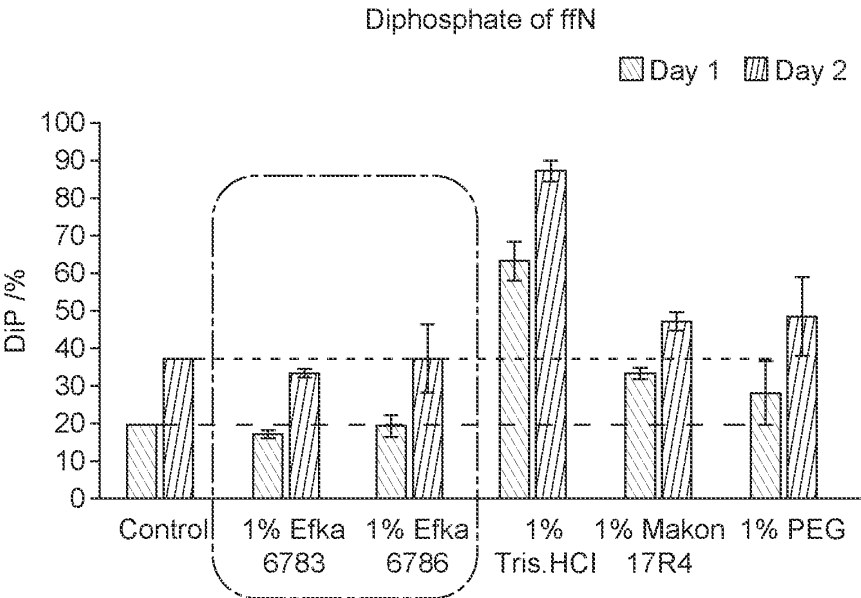
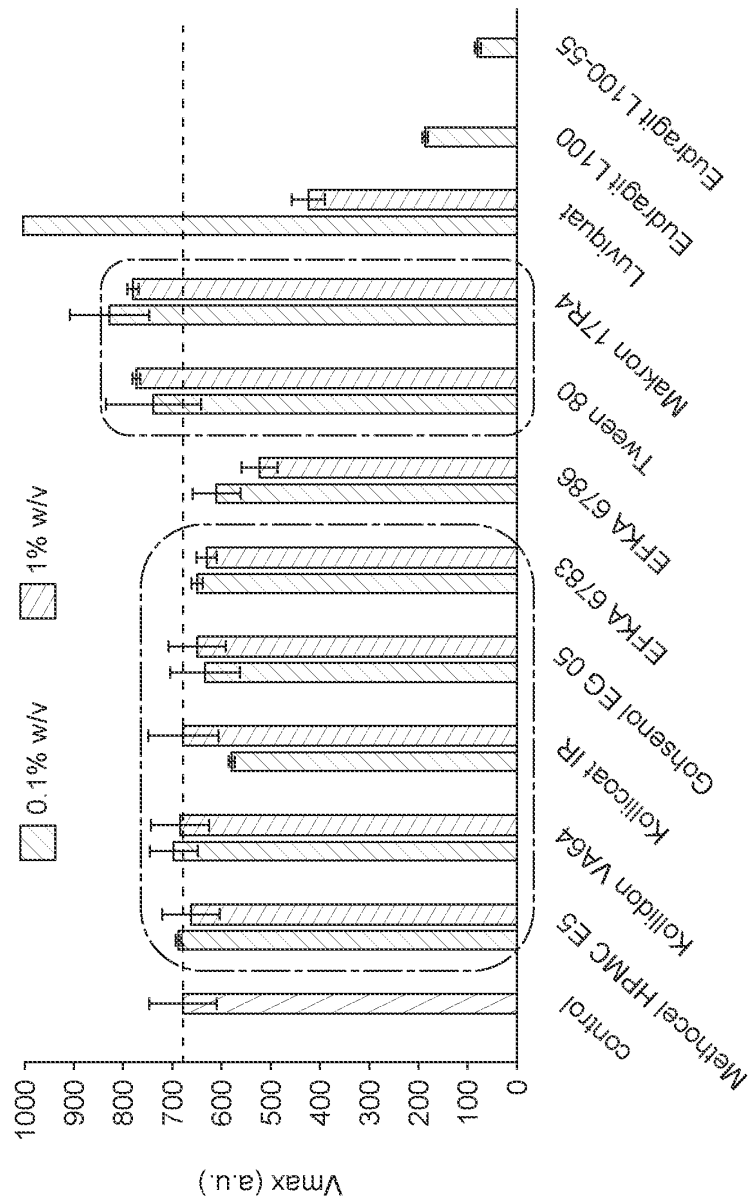


FIG. 17F



Kollicoat Protect is a mixture of Kollicoat IR and Gohsenol EG

FIG. 18

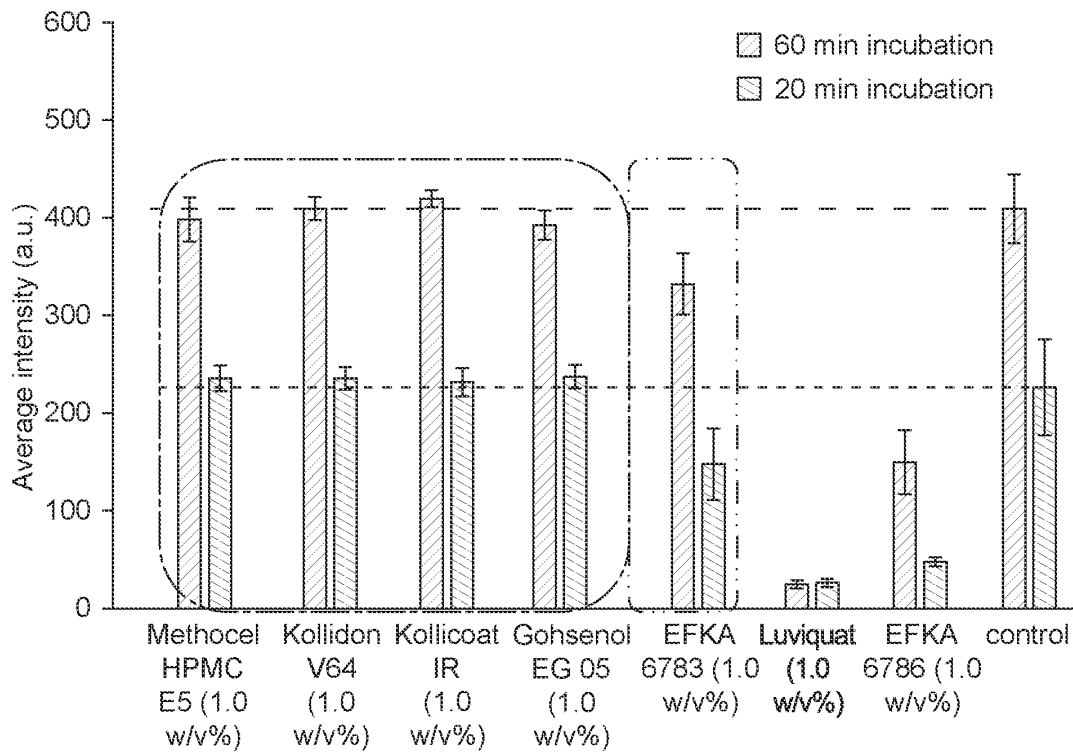


FIG. 19A

Clustering performance of ExAmp spiked with  
Coating materials by cBOT 1<sup>st</sup> base assay

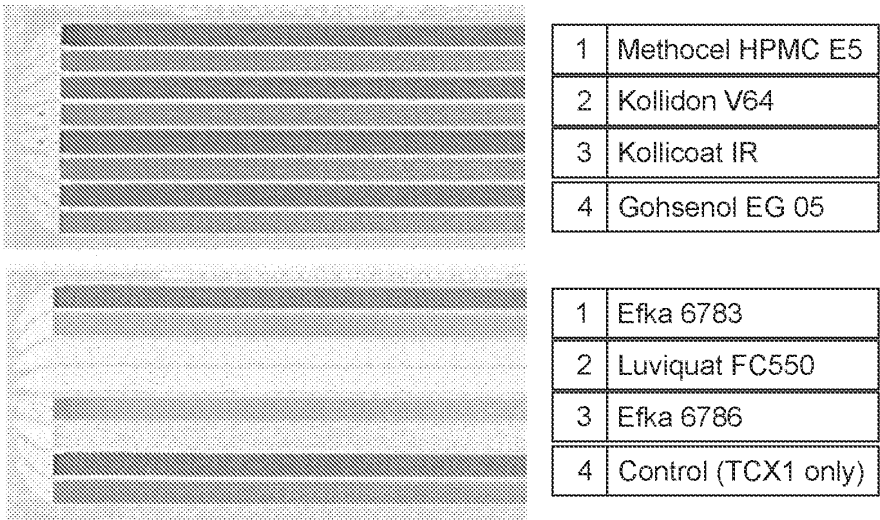


FIG. 19B

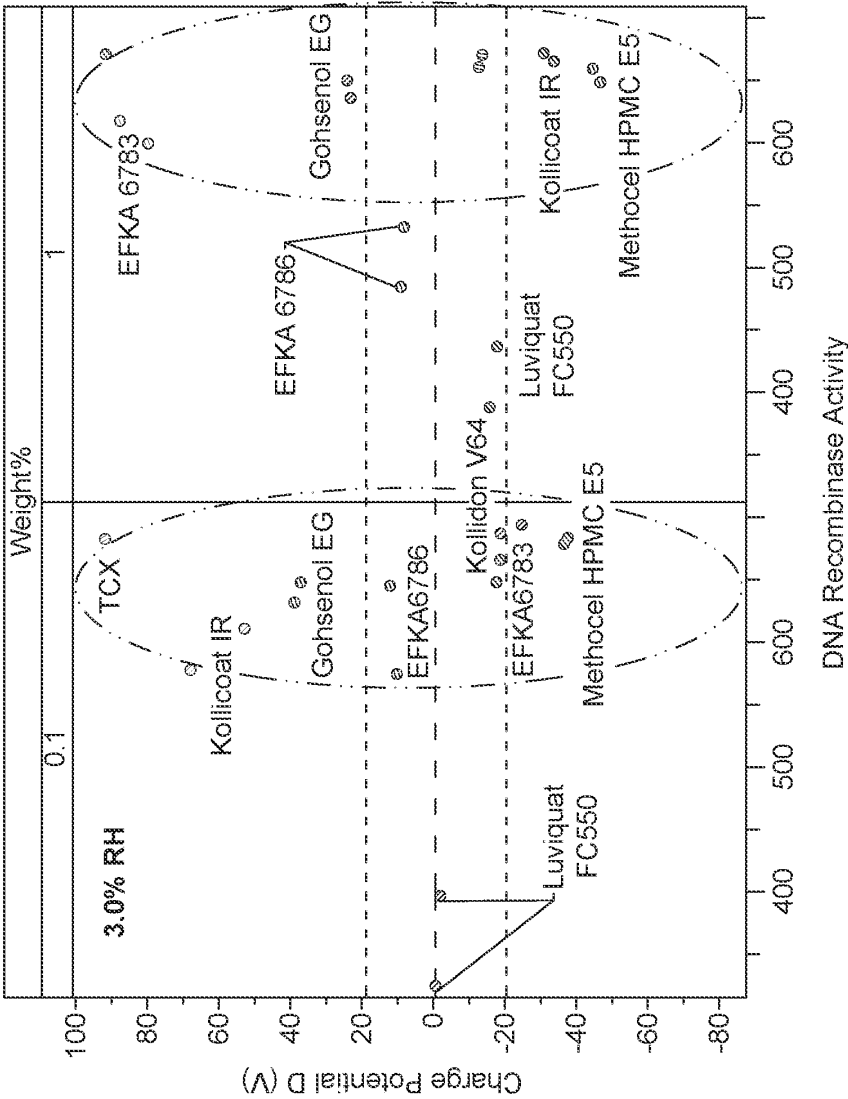


FIG. 20

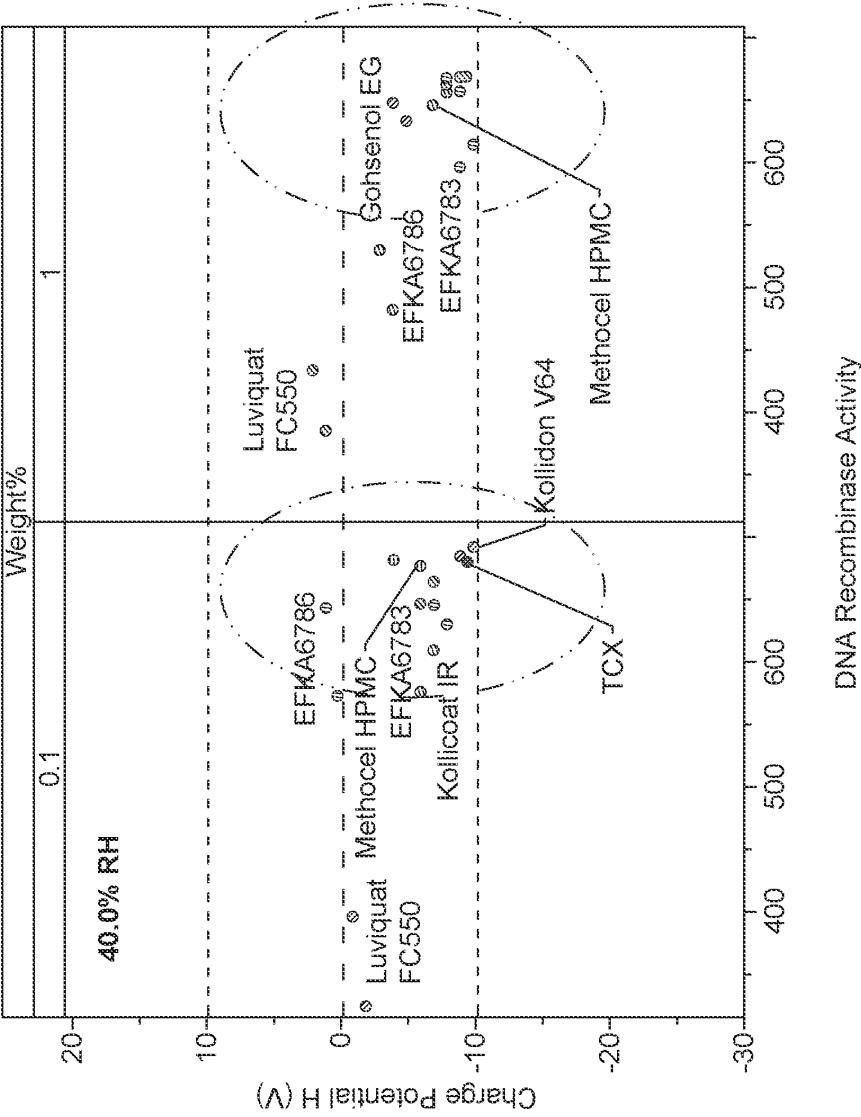


FIG. 21

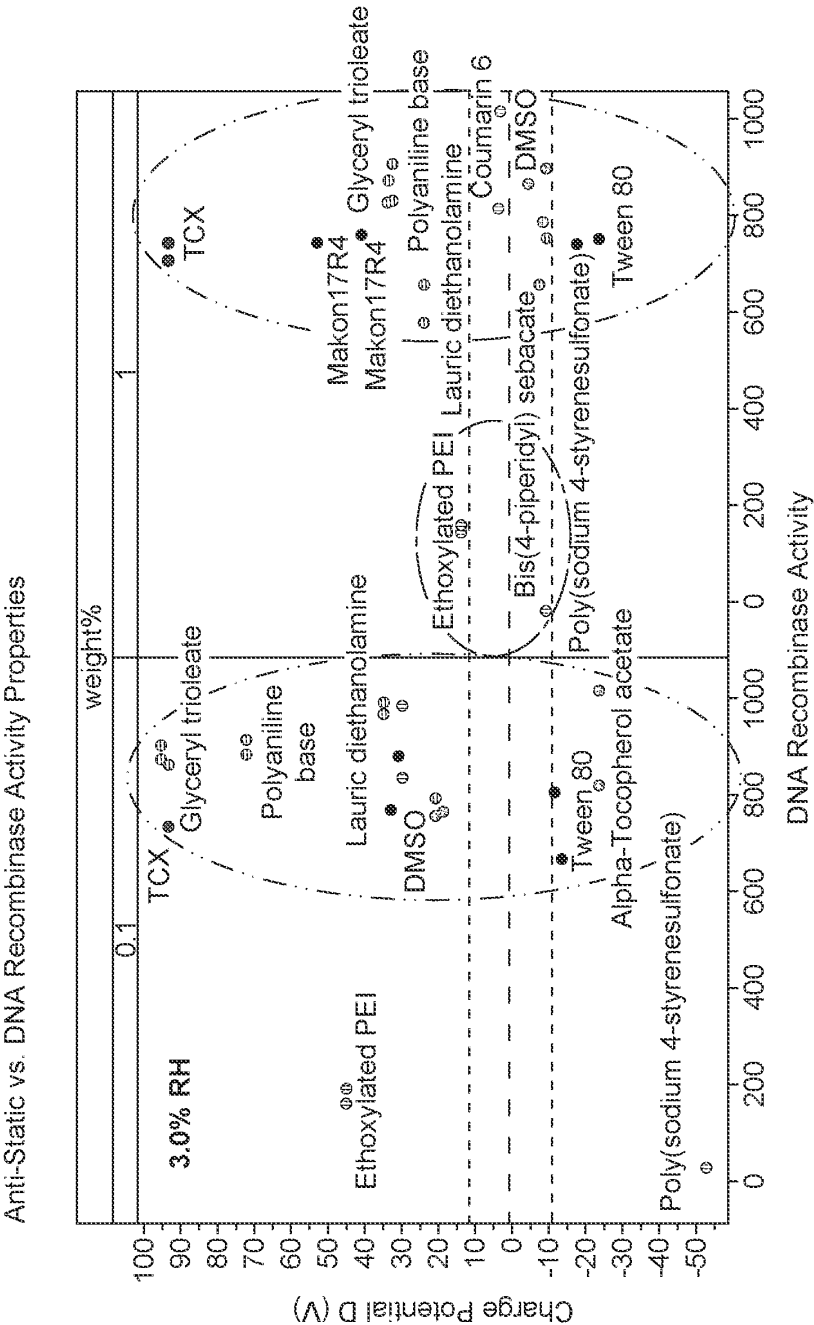


FIG. 22

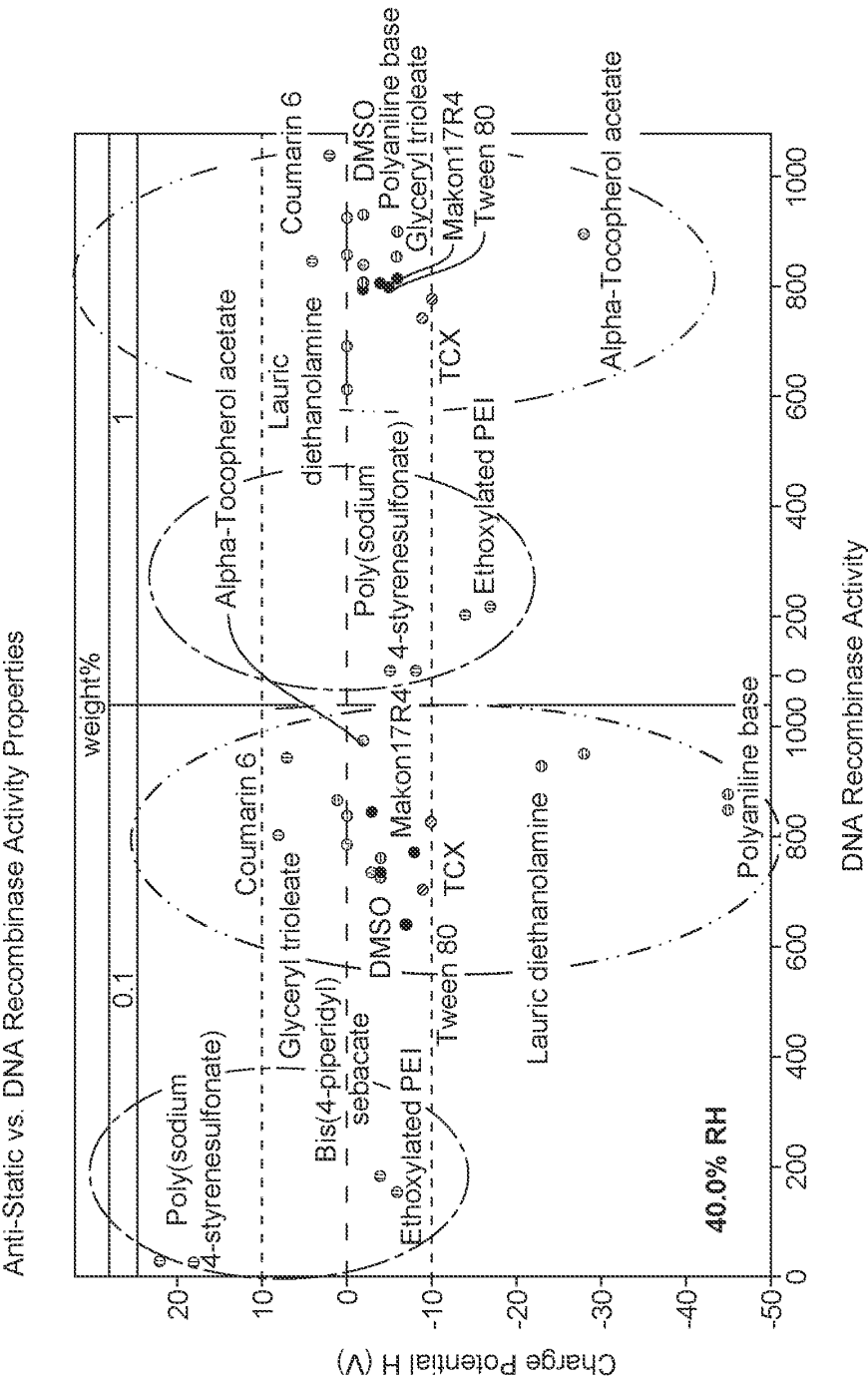


FIG. 23

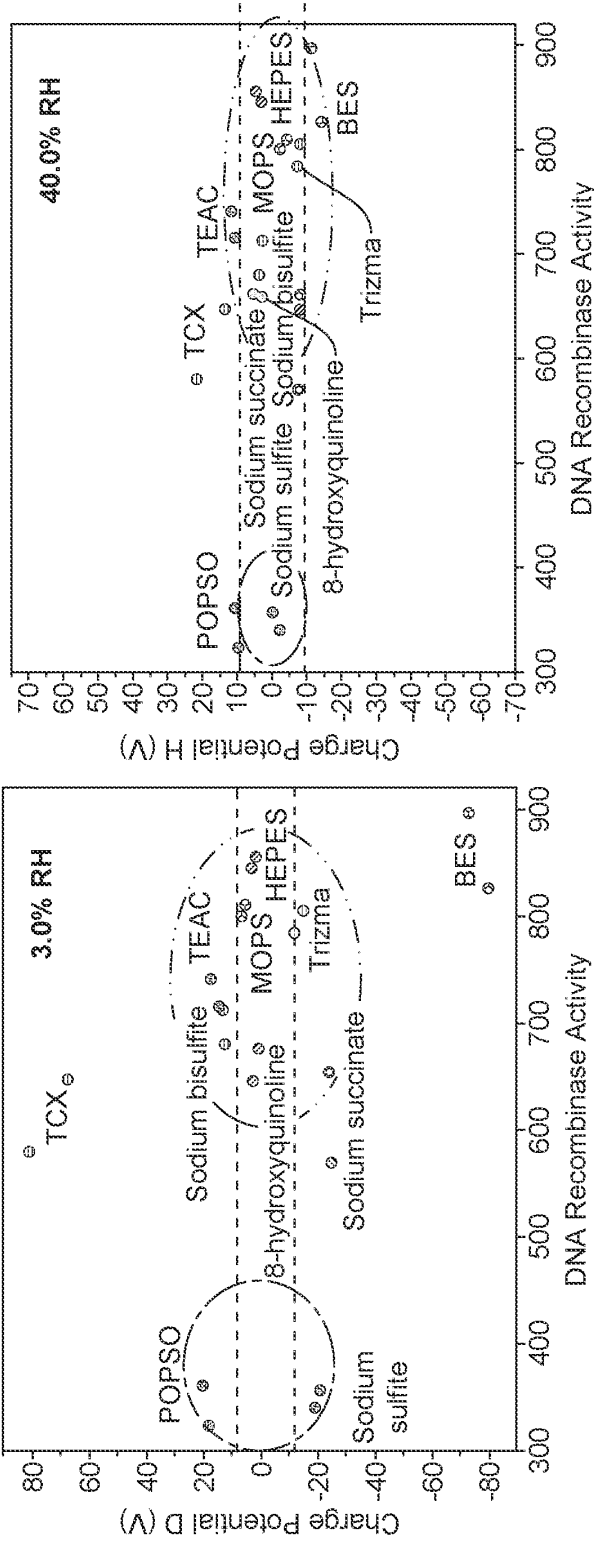


FIG. 24

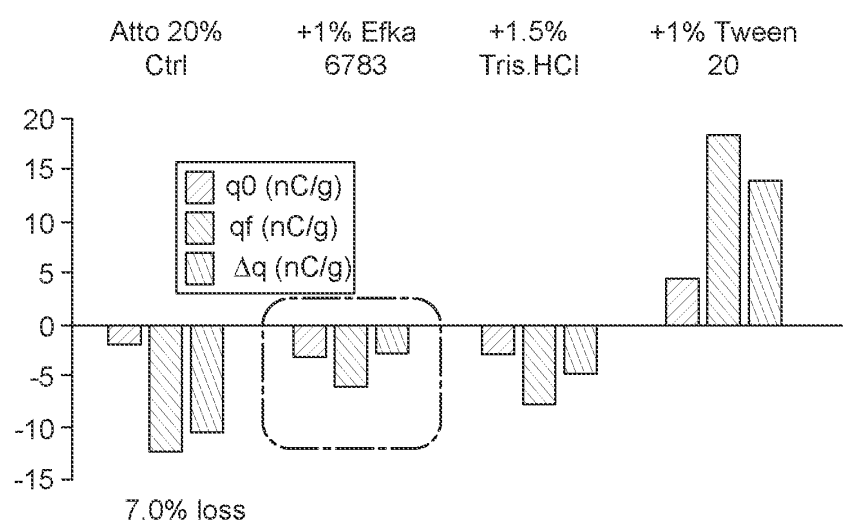
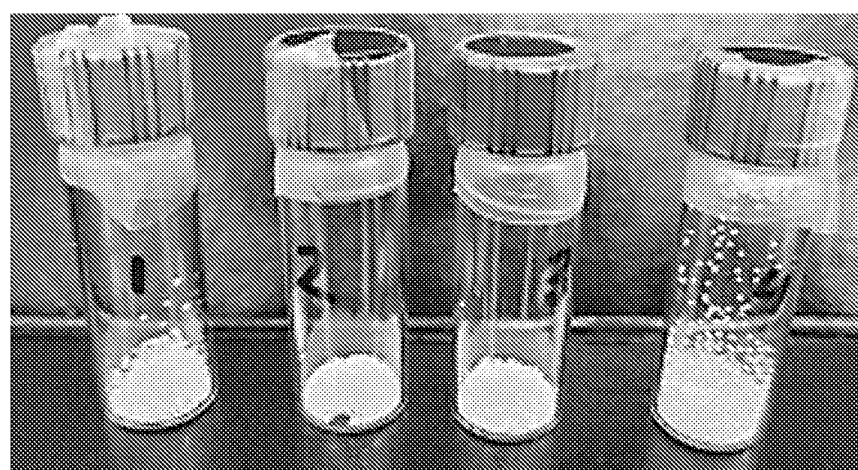


FIG. 25A

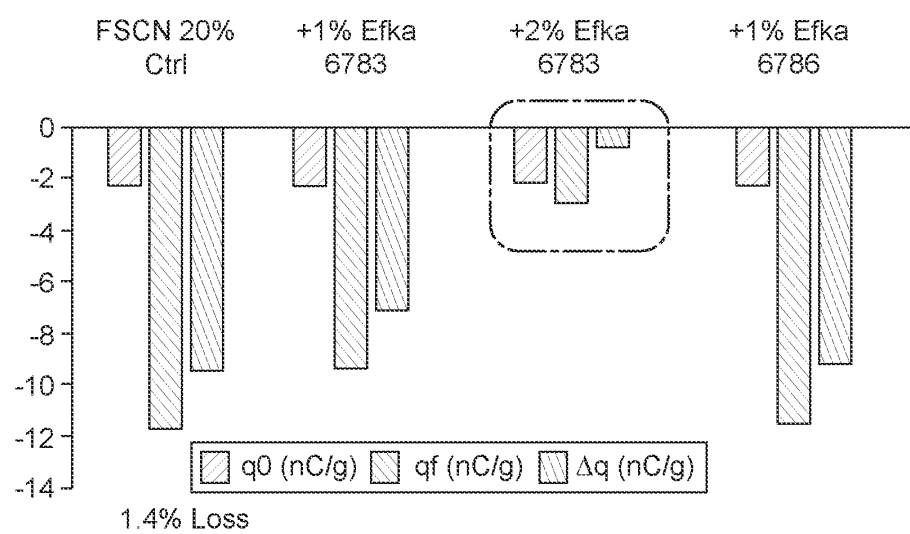
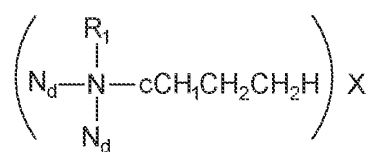
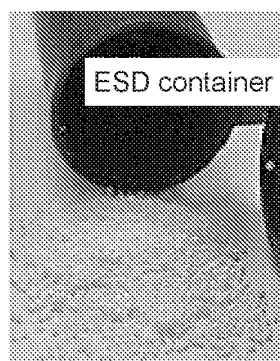


FIG. 25B

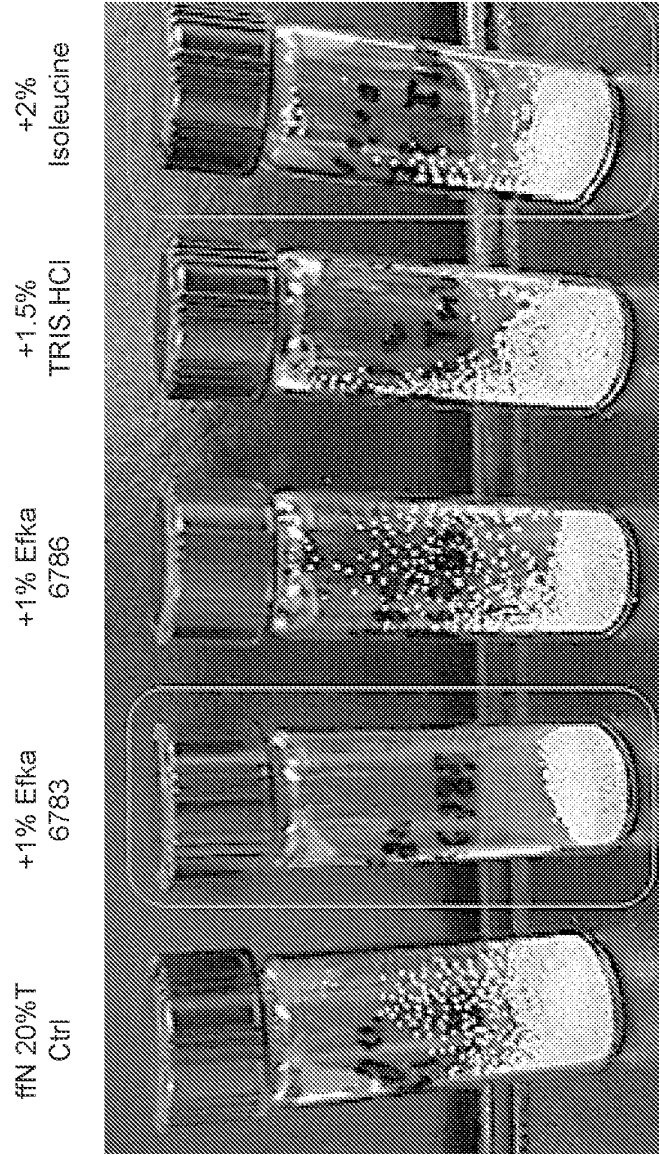
Atto and FSCN  
(both 20%  
trehalose) are  
dry-compounded  
with the help of  
Anti-static agent  
Efka IO 6783 in  
Matrix format



No anti-static

W/ 1% Efka IO

FIG. 25C



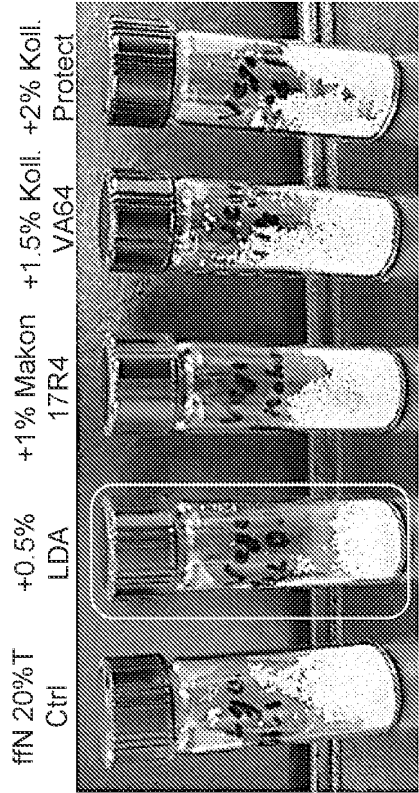


FIG. 26B

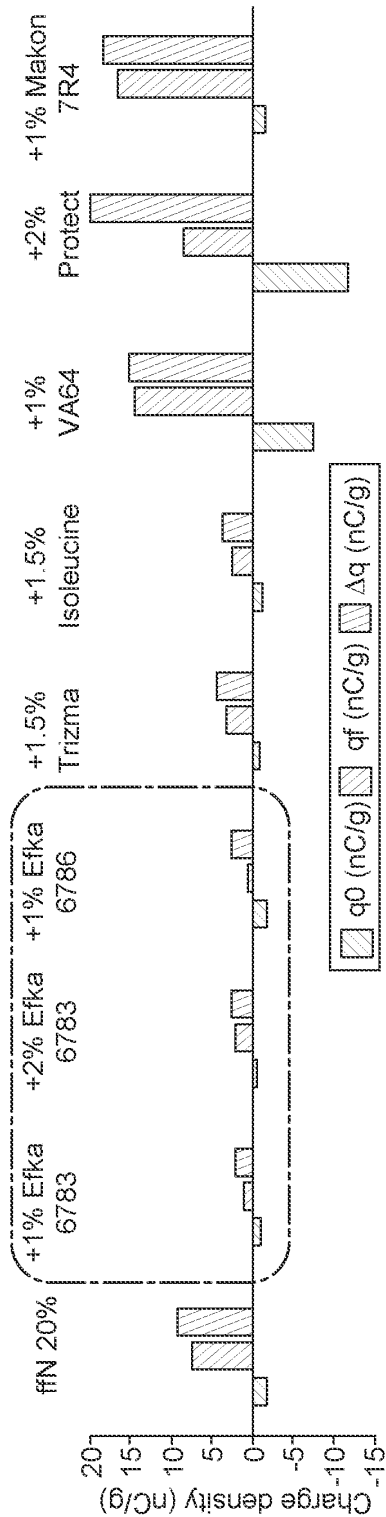


FIG. 26C

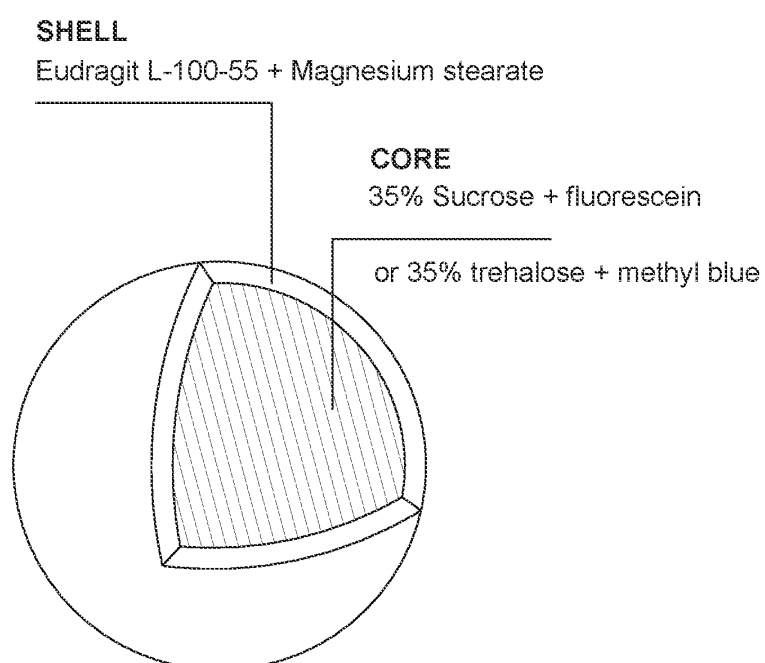
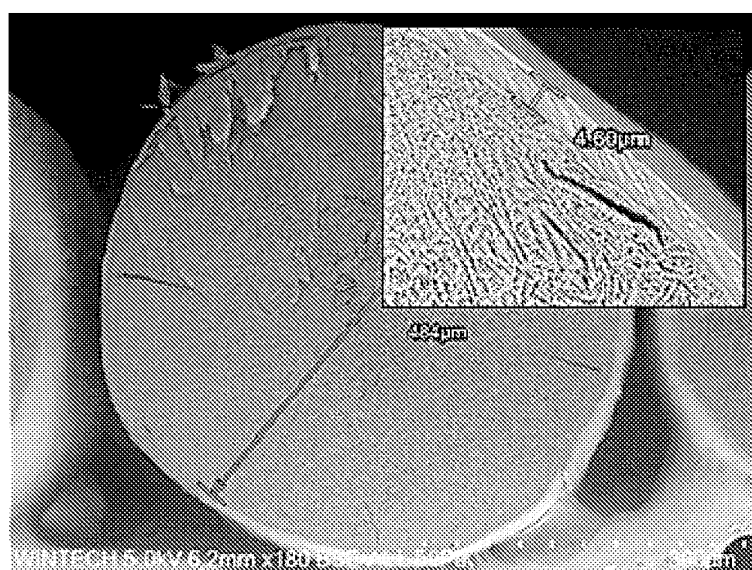


FIG. 27A



Weight gain from coating is 5-7%

FIG. 27B

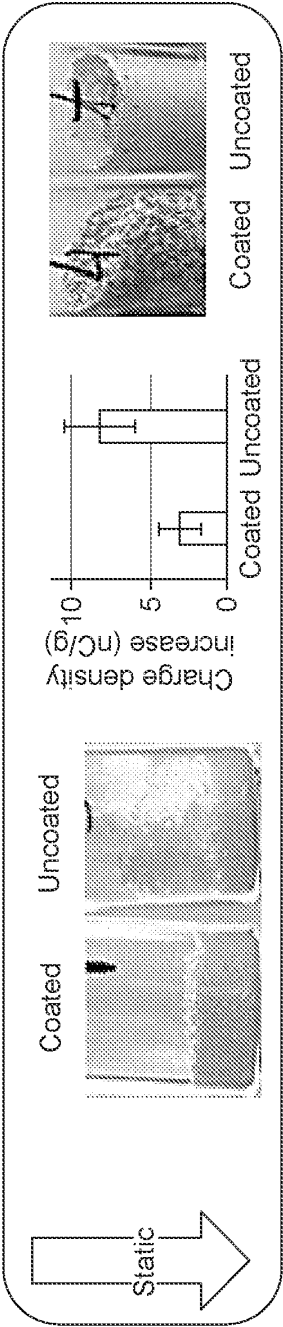


FIG. 27C

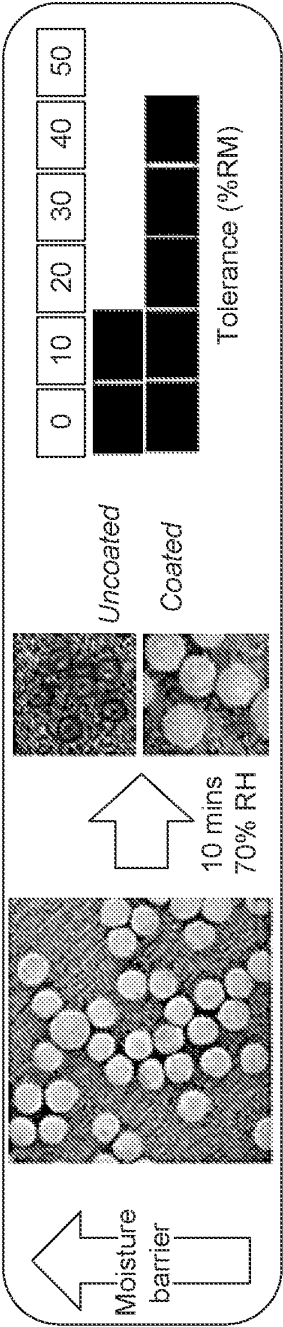


FIG. 27D

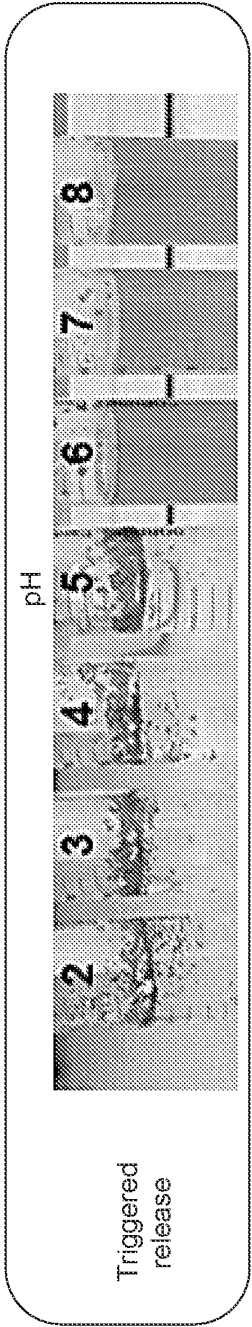


FIG. 27E

800um FSCN Wurster-Spray 20% Coated  
w/ Kollidon VA64 + Efka 6783 + PEG (#6)

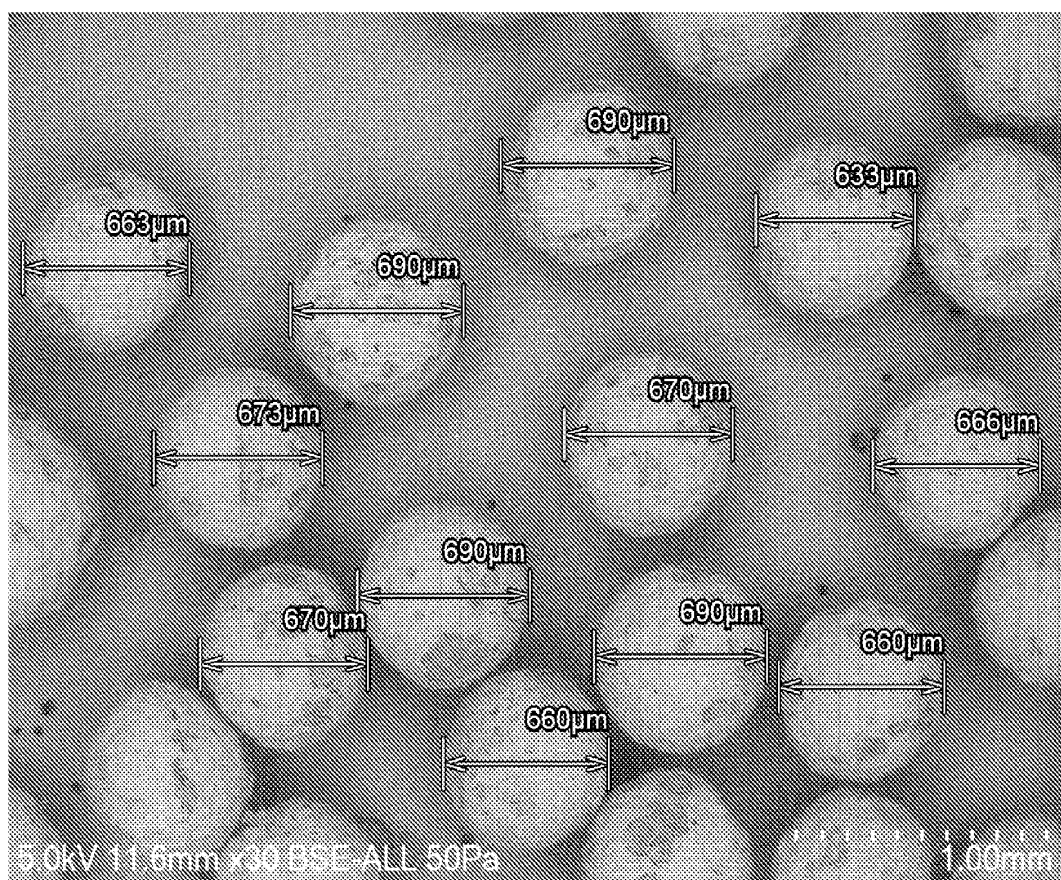


FIG. 28A

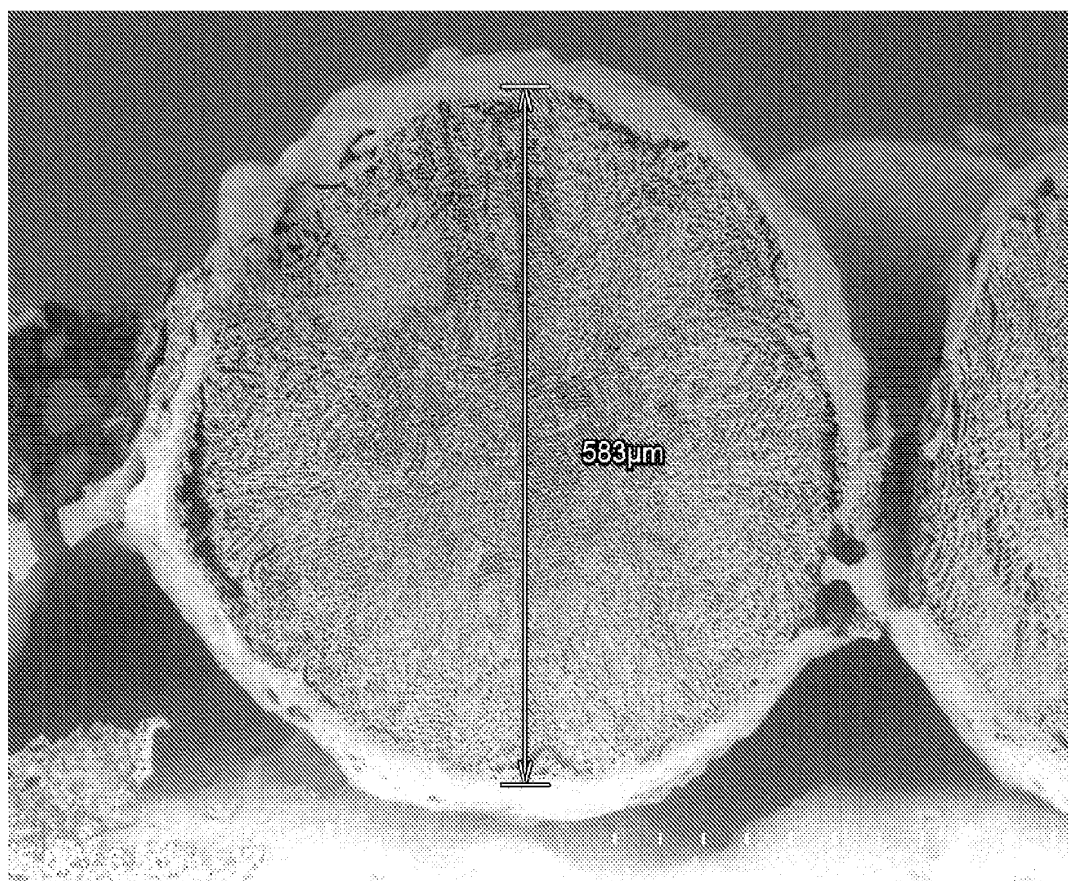


FIG. 28B

Cryo Ion-Mill SEM of DNA Rec. 15% Coated  
w/ Kollidon VA64 + Efka 6783 + PEG (#8)

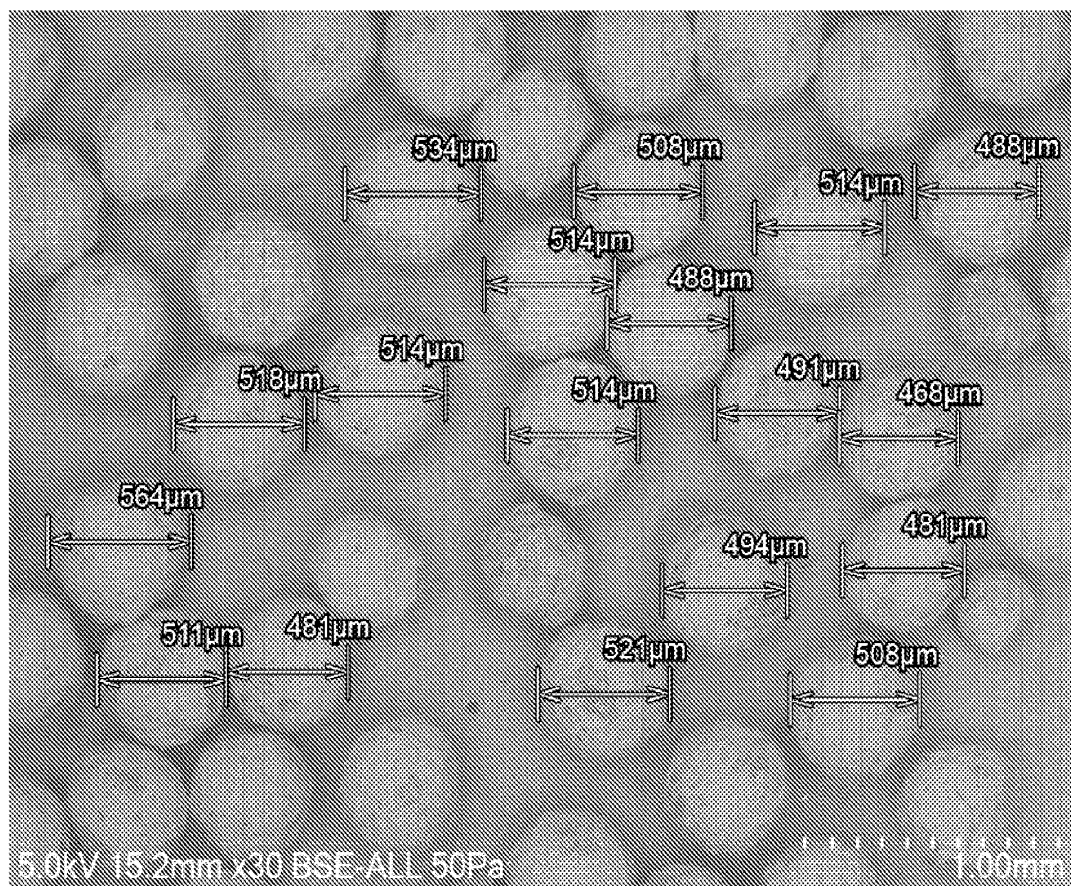


FIG. 28C

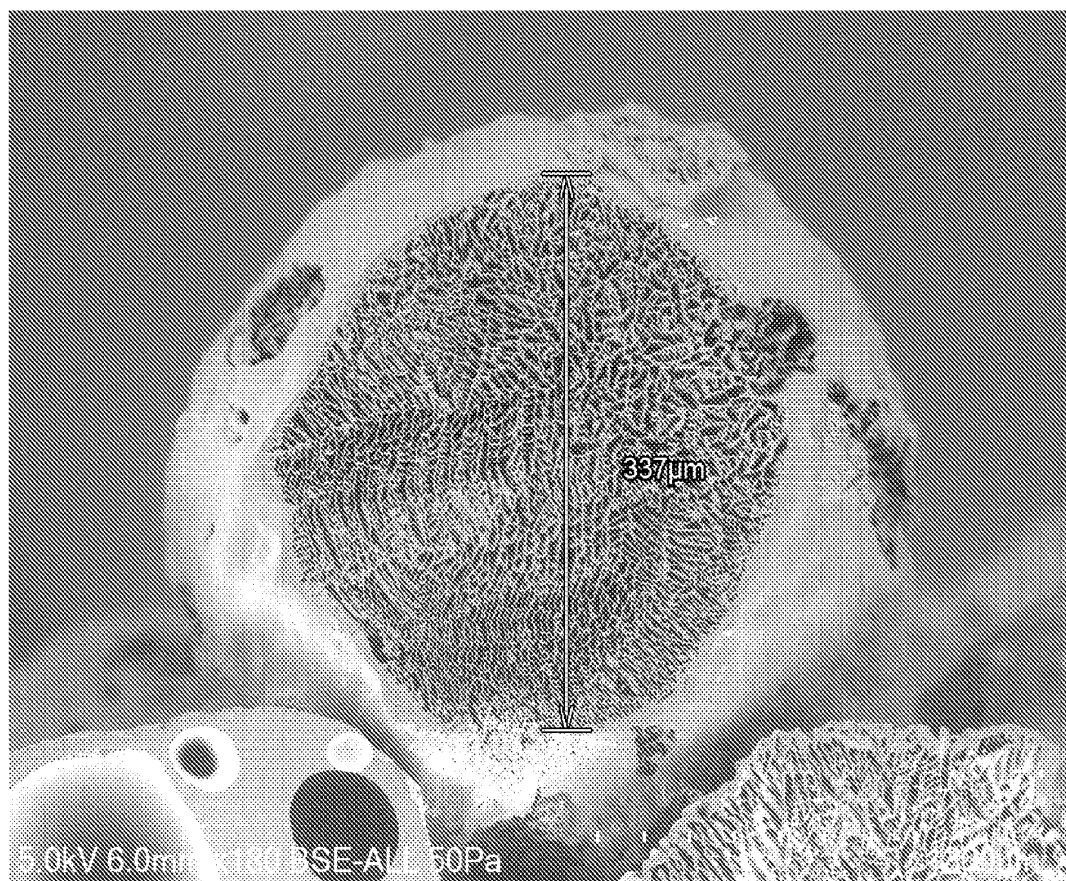


FIG. 28D

Cryo Ion-Mill SEM of ffN 10% Coated  
w/ Kollidon VA64 + Efka 6783 + PEG (#11)

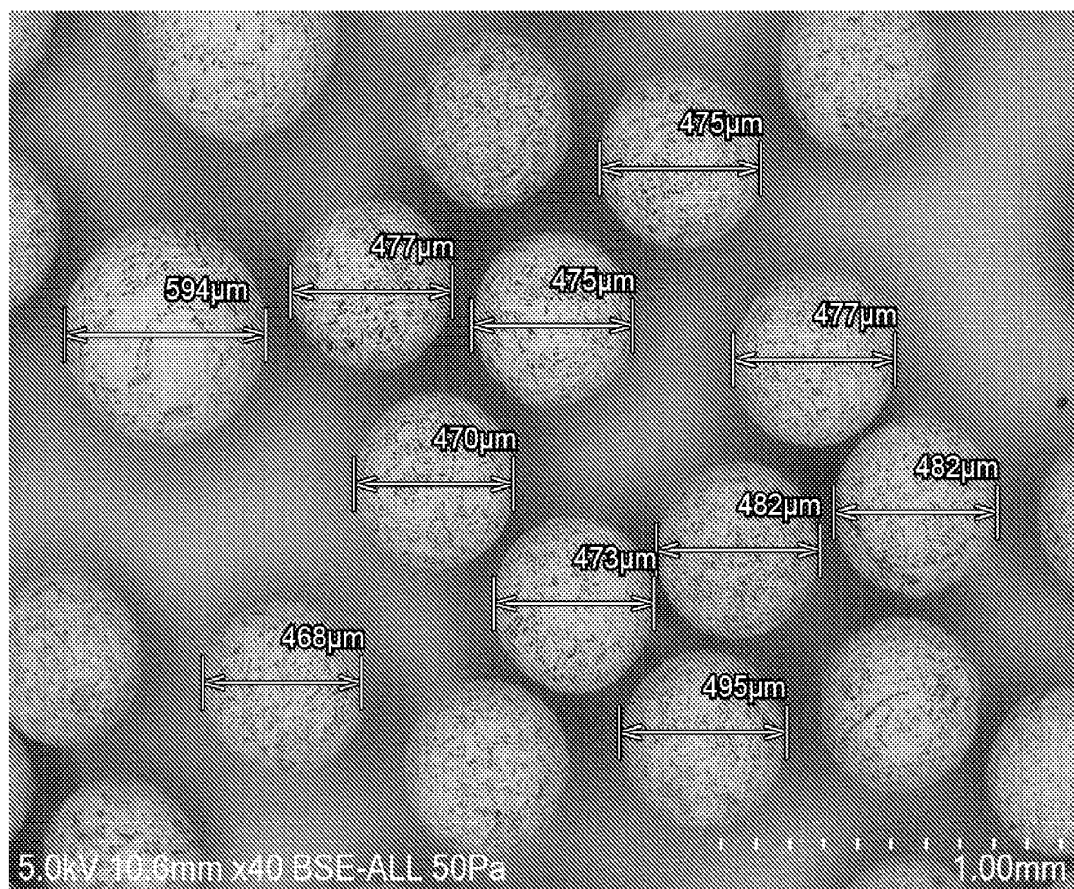


FIG. 28E

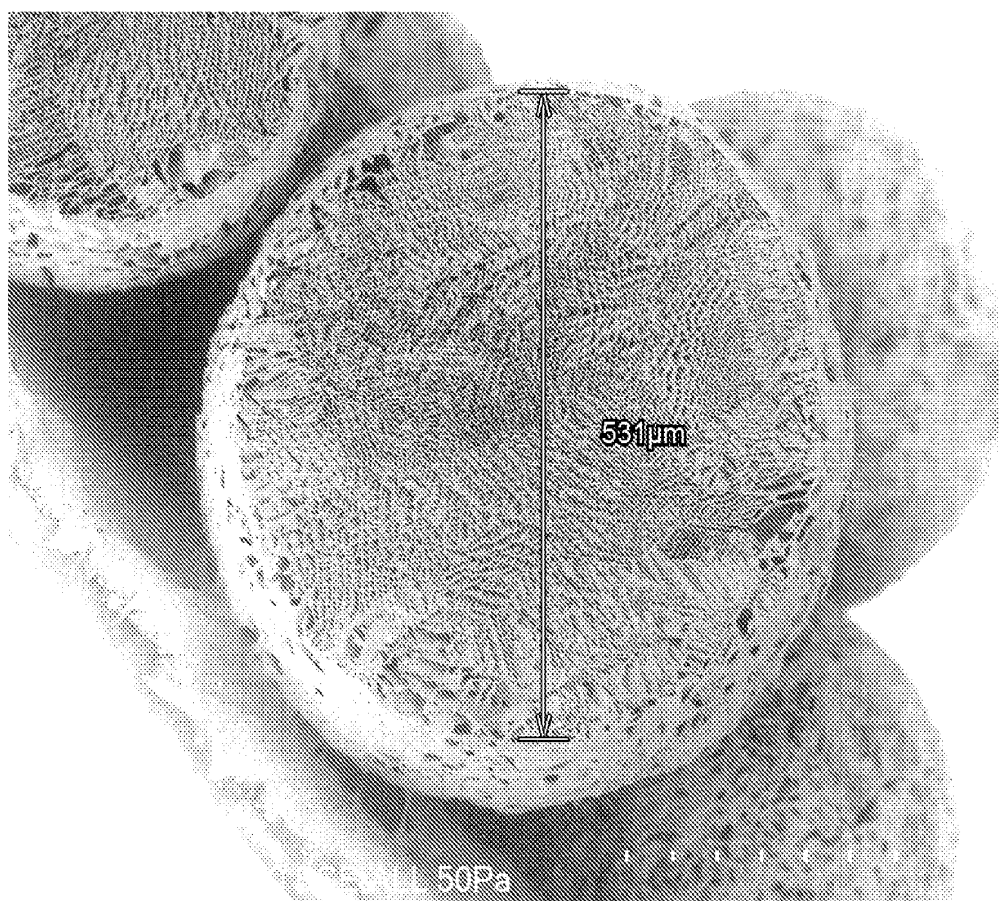
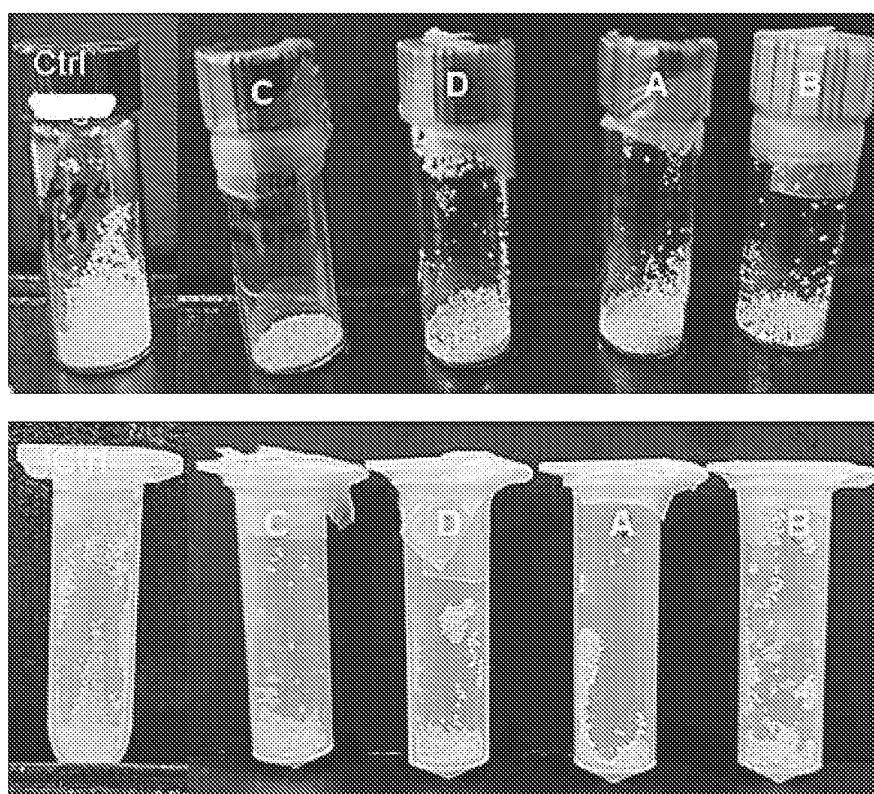


FIG. 28F



- A: Coated w/ 10% Kollidon VA64 & Efka 6783  
B: Coated w/ 10% Kollidon VA64  
C: Coated w/ 15% Kollicoat Protect & Efka 6783  
D: Coated w/ 10% Kollicoat Protect

FIG. 29A

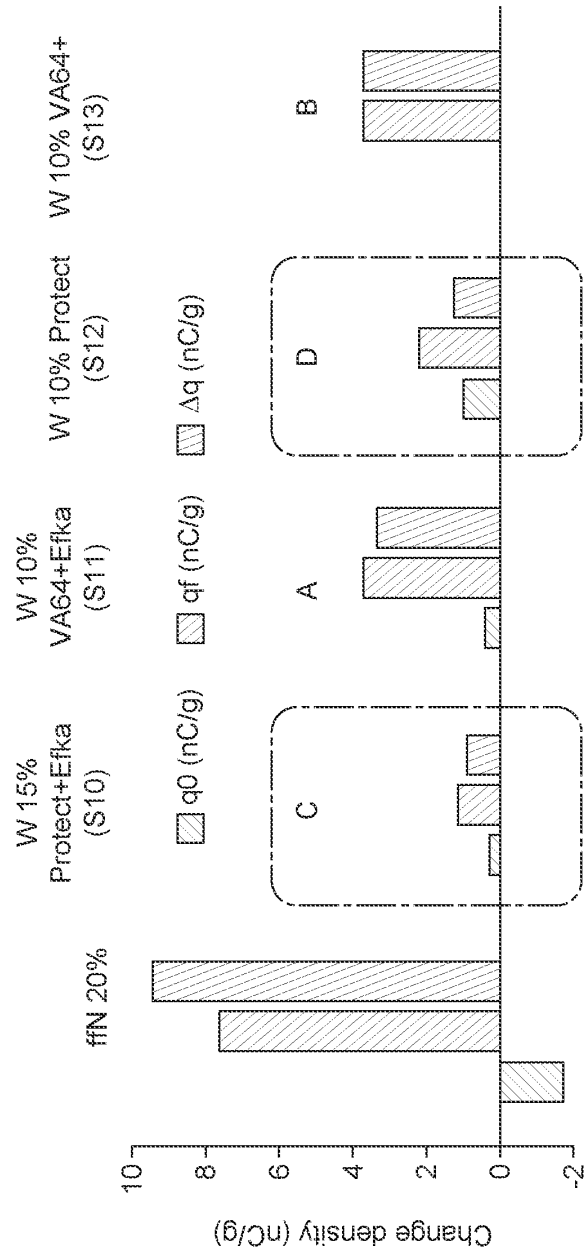
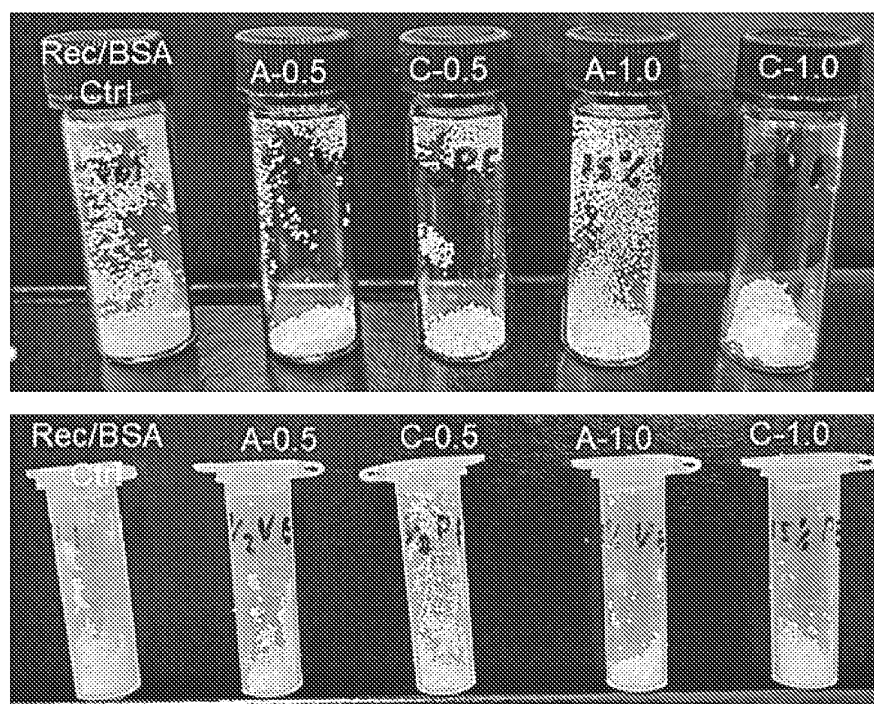


FIG. 29B



A-0.5: Coated w/ 7.5% Kollidon VA64 & Efka 6783  
A-1.0: Coated w/ 15% Kollidon VA64 & Efka 6783  
C-0.5: Coated w/ 7.5% Kollicoat Protect & Efka 6783  
C-1.0: Coated w/ 15% Kollicoat Protect & Efka 6783

FIG. 30A

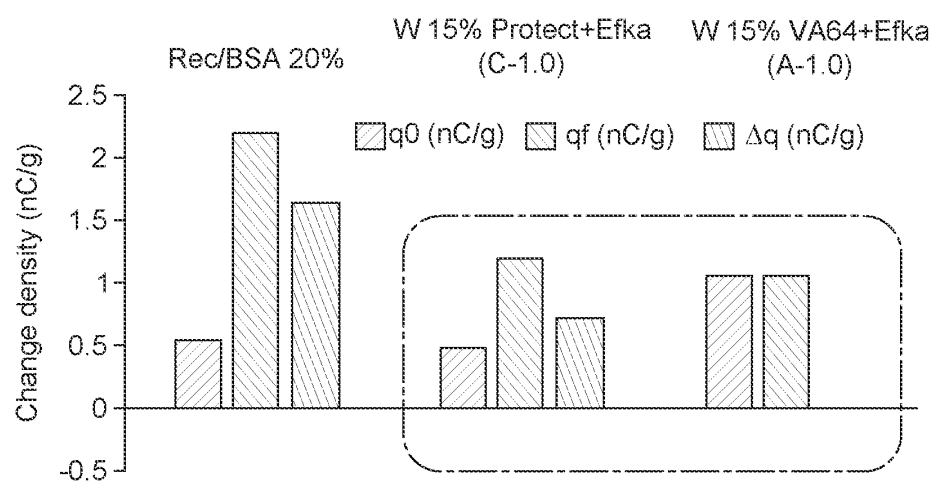


FIG. 30B

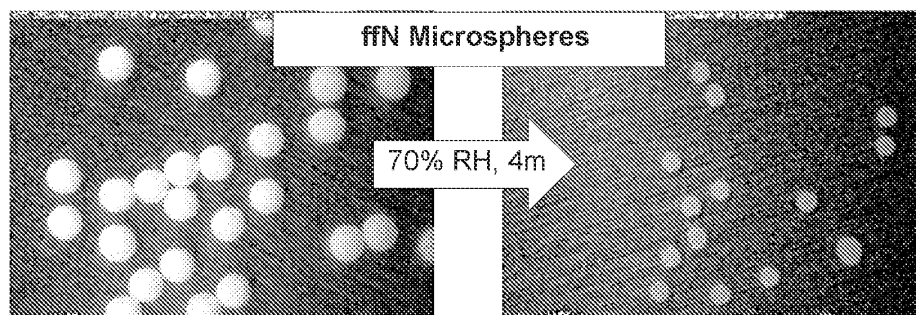


FIG. 31A

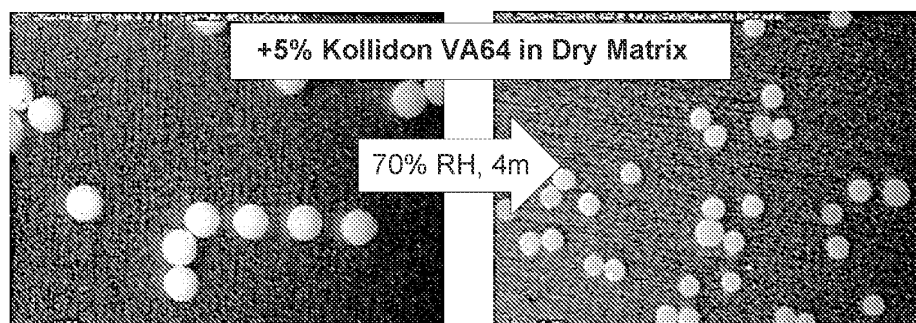


FIG. 31B

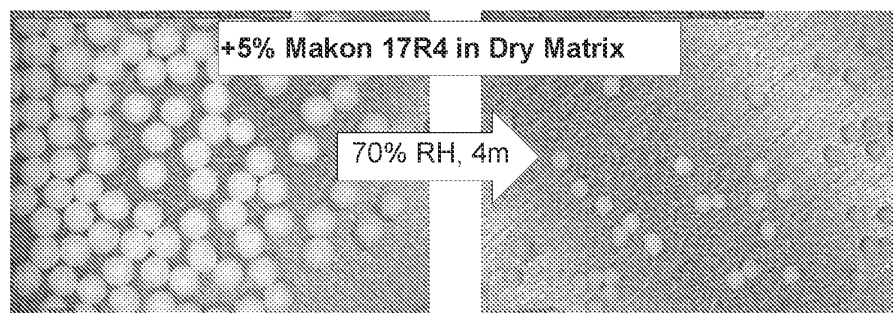


FIG. 31C

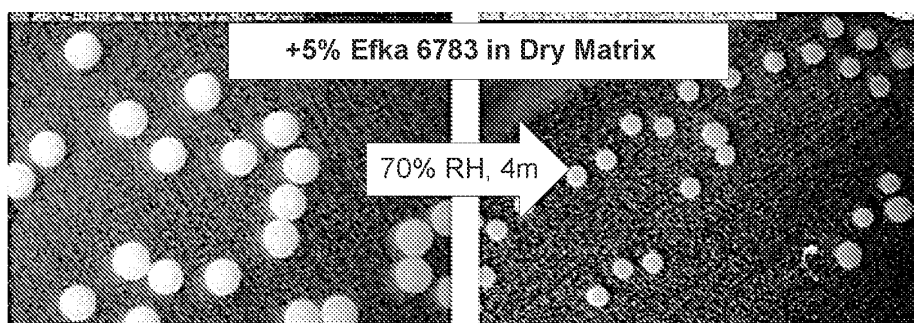


FIG. 31D

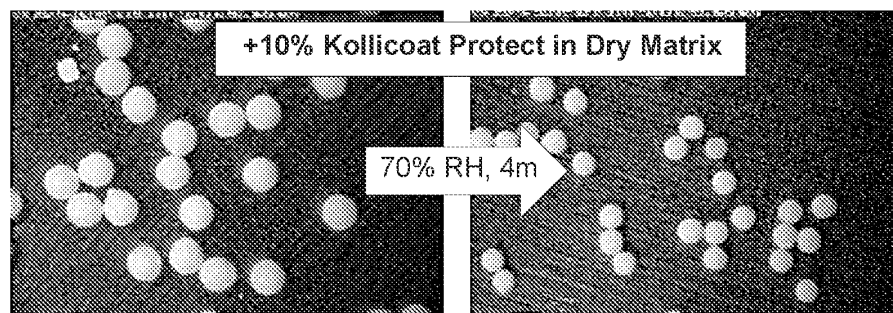


FIG. 31E

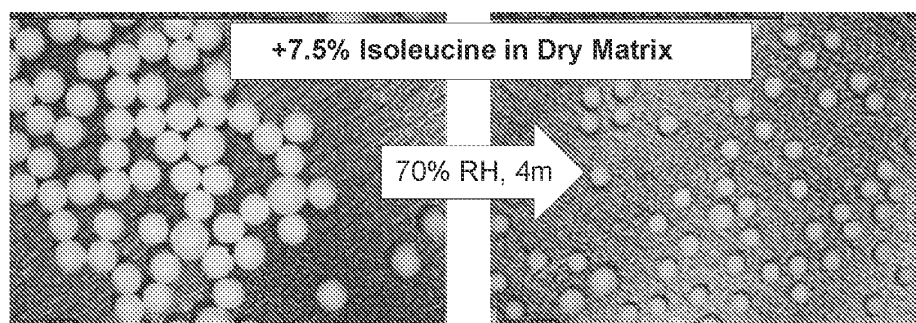


FIG. 31F

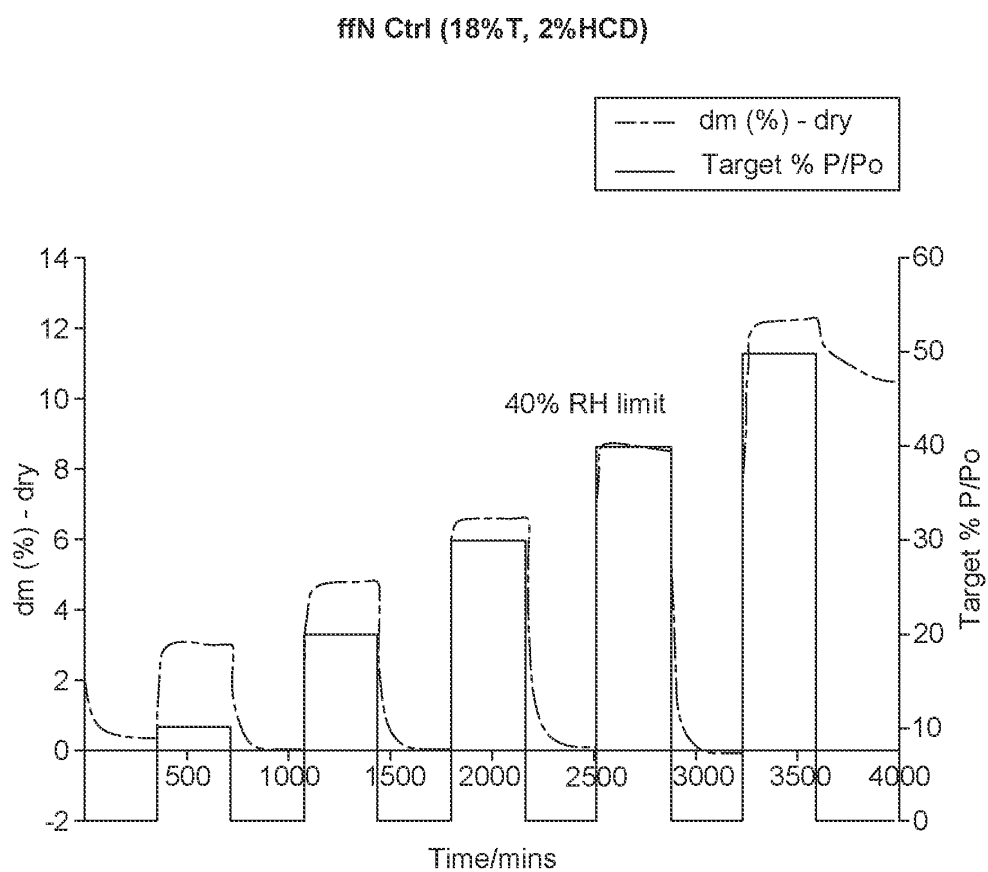


FIG. 32A

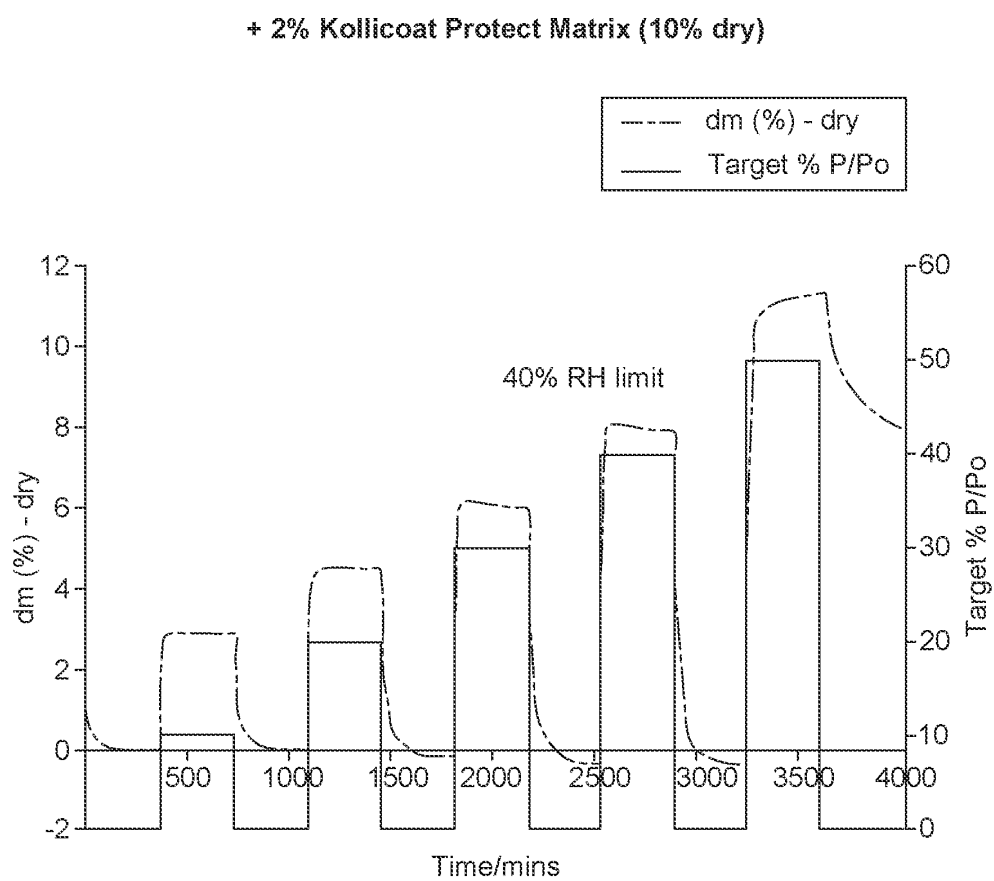


FIG. 32B

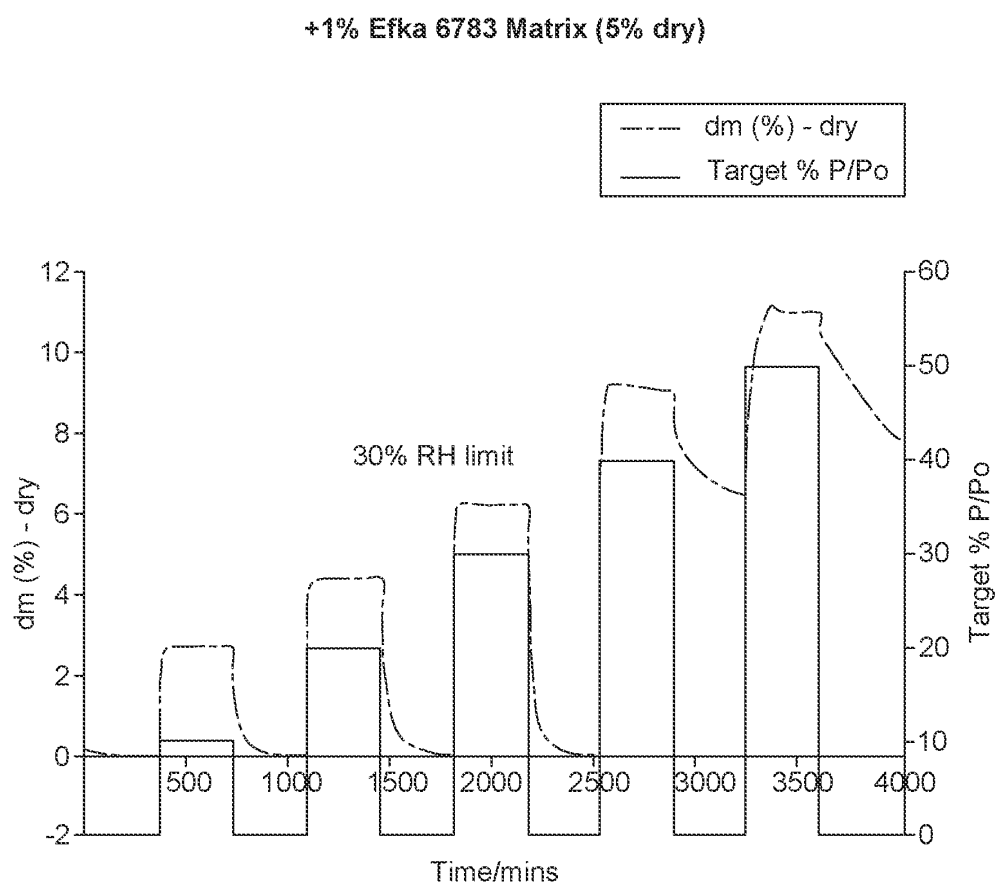


FIG. 32C

+1% Kollidon VA64 Matrix (5% dry)

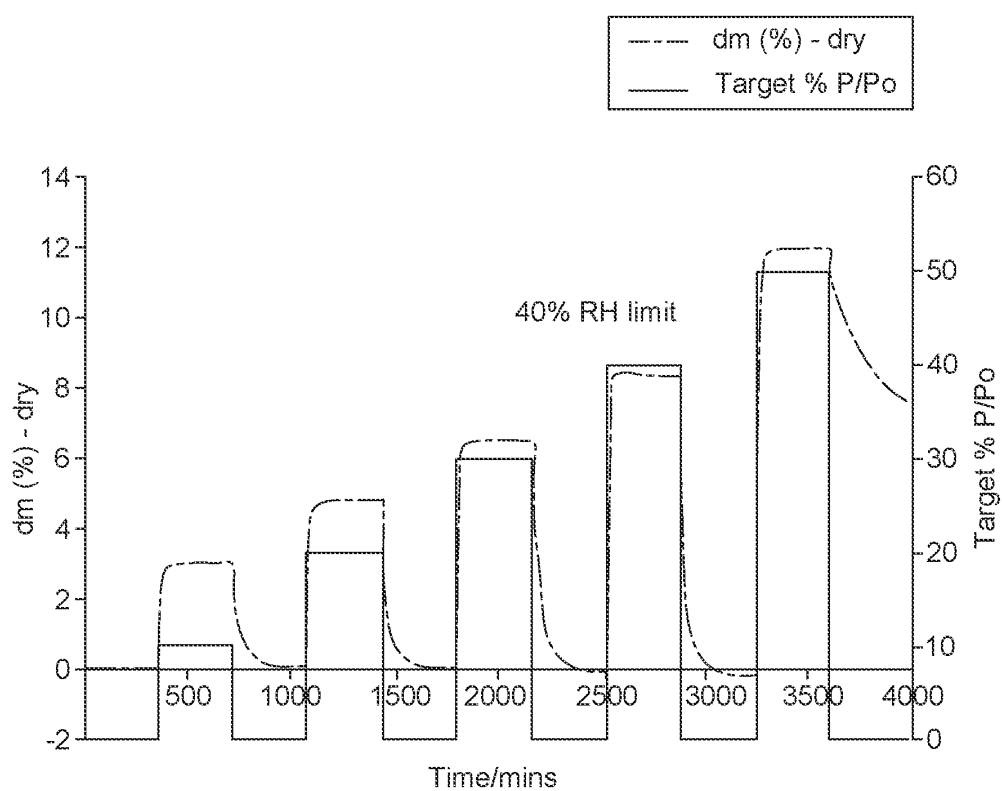


FIG. 32D

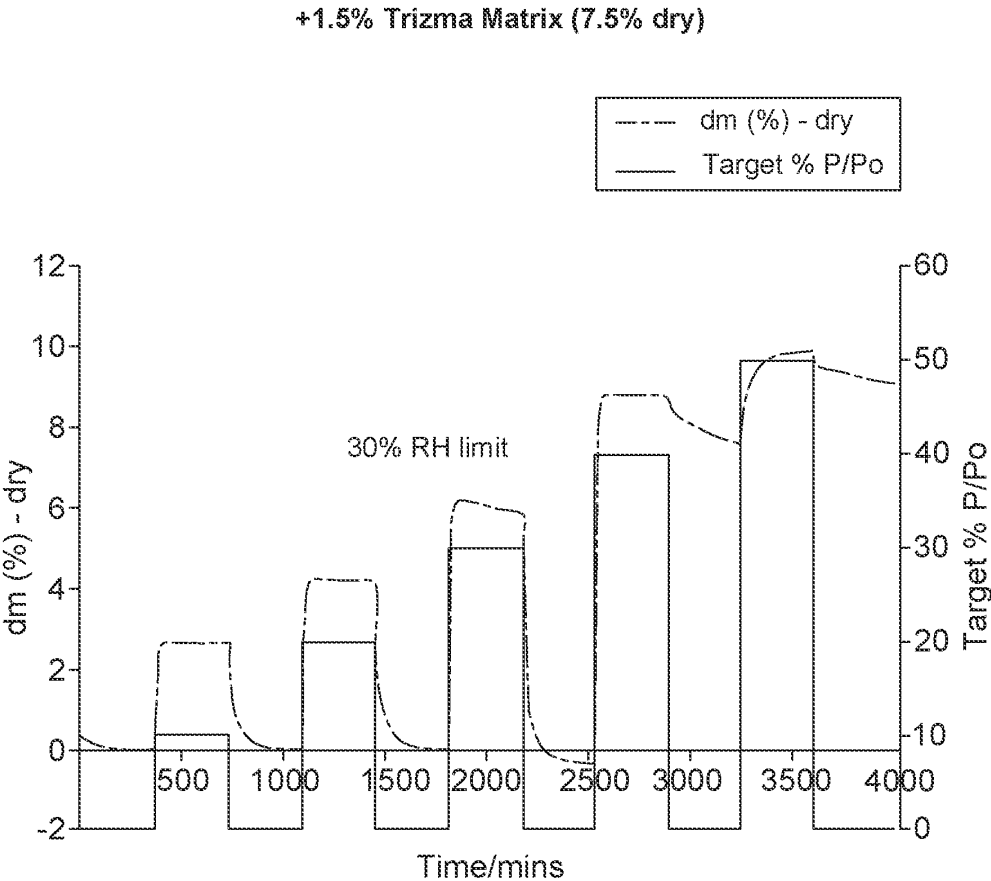


FIG. 32E

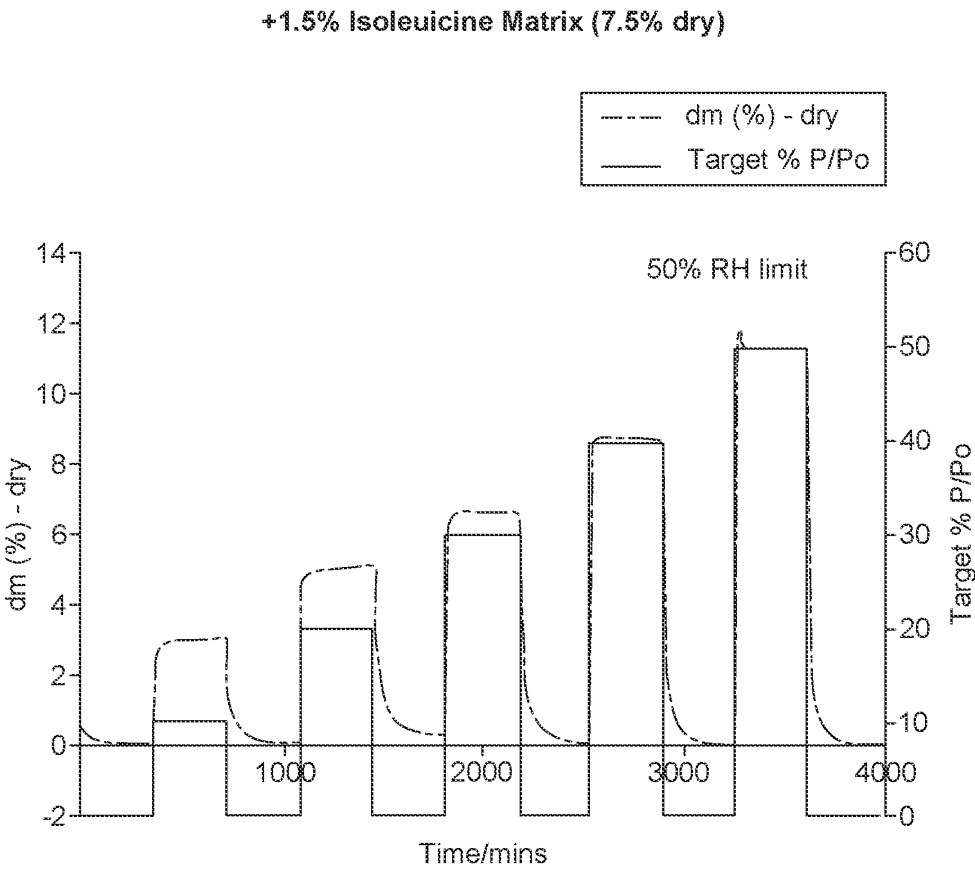


FIG. 32F

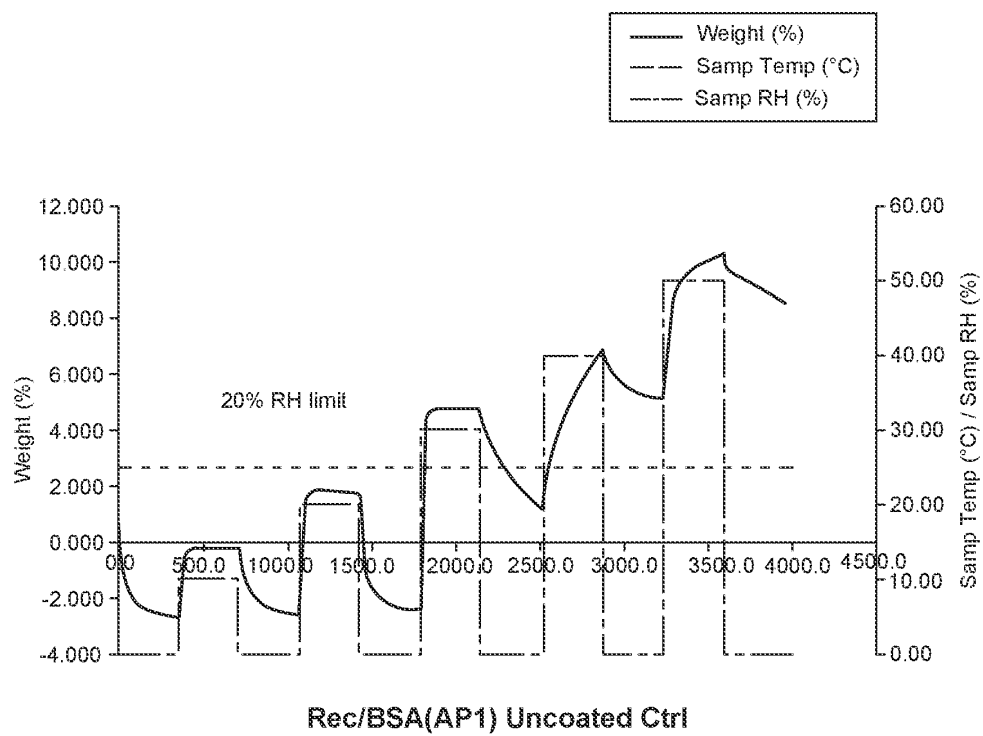


FIG. 33A

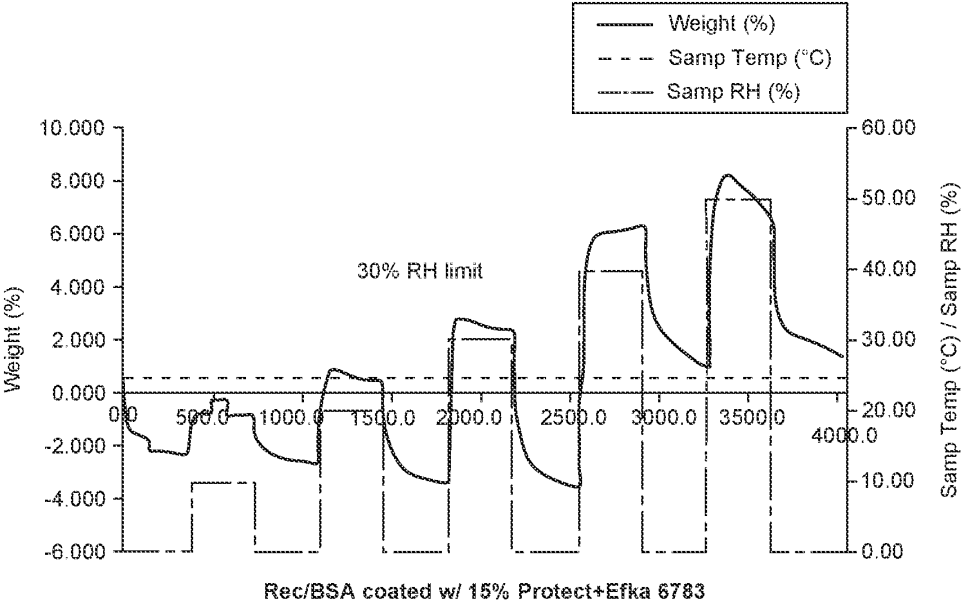


FIG. 33B

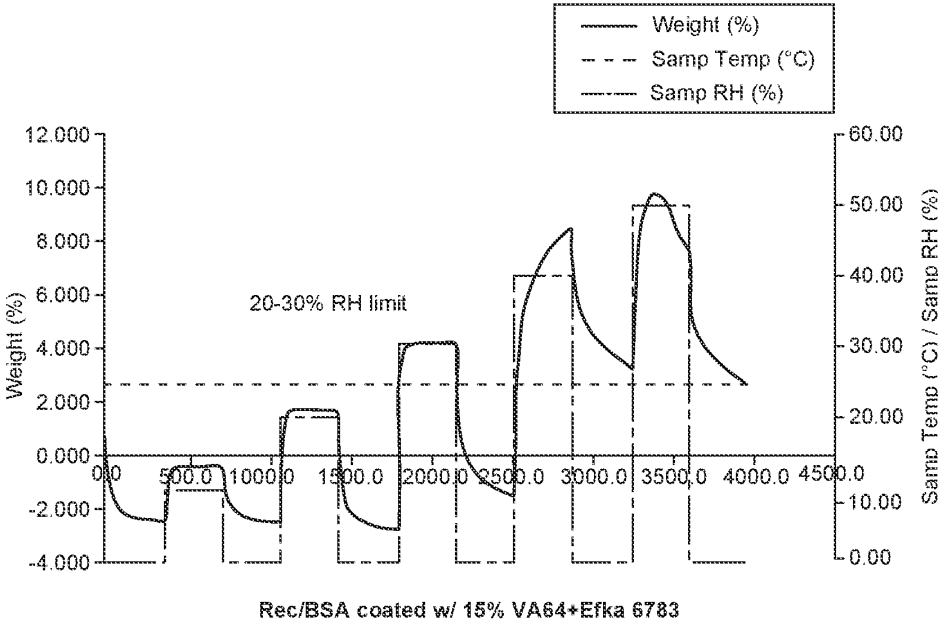


FIG. 33C

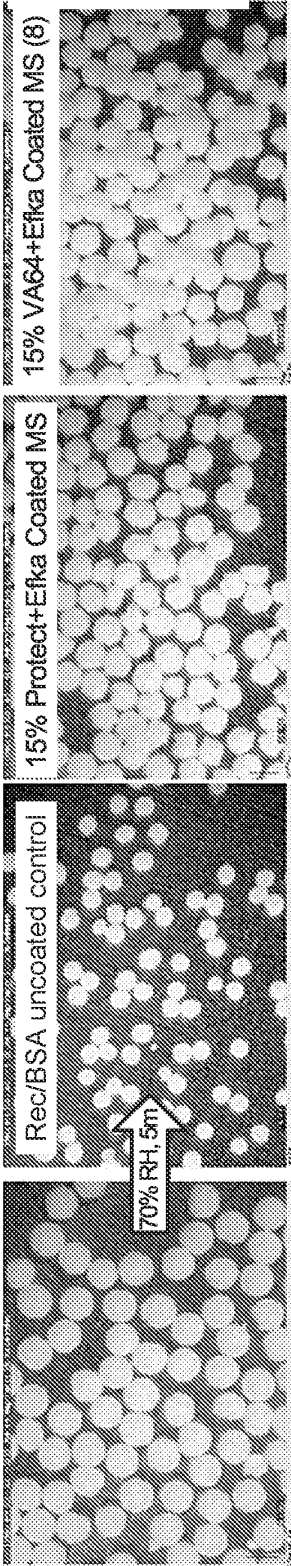


FIG. 33D

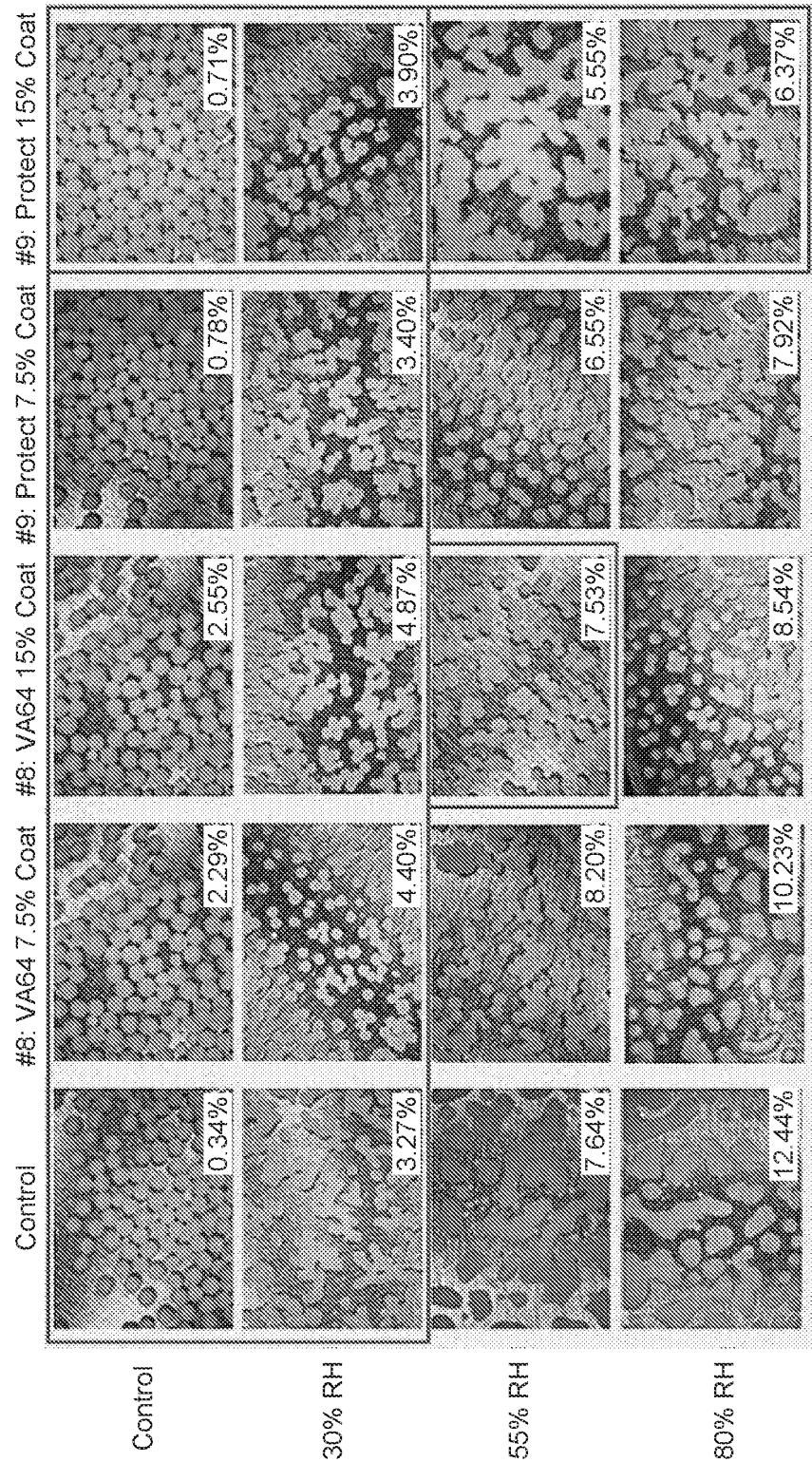


FIG. 34A

-----○----- Uncoated Rec/BSA Ctrl      - - -○- - - 7.5% Coated VA64+Efka  
-----○----- 7.5% Coated Protect+Efka      —○— 15% Coated VA64+Efka  
-----○----- 15% Coated Protect+Efka

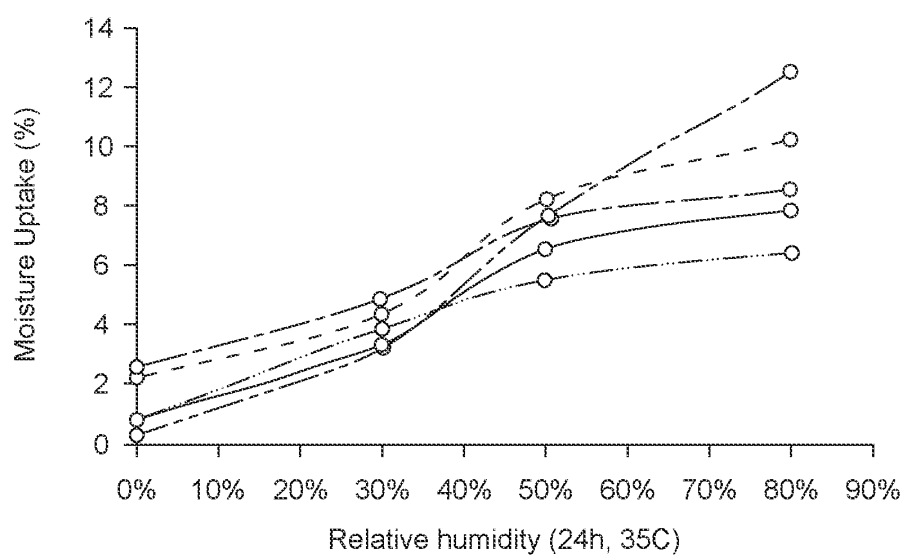


FIG. 34B

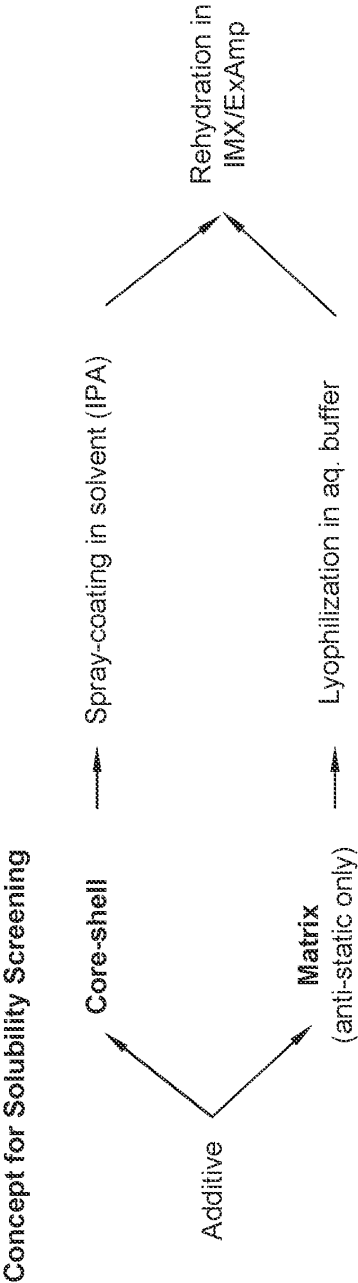


FIG. 35

Kollidon VA64, Efka, Eudragit are soluble in spray-coating solution (15% water/solvent) and buffer

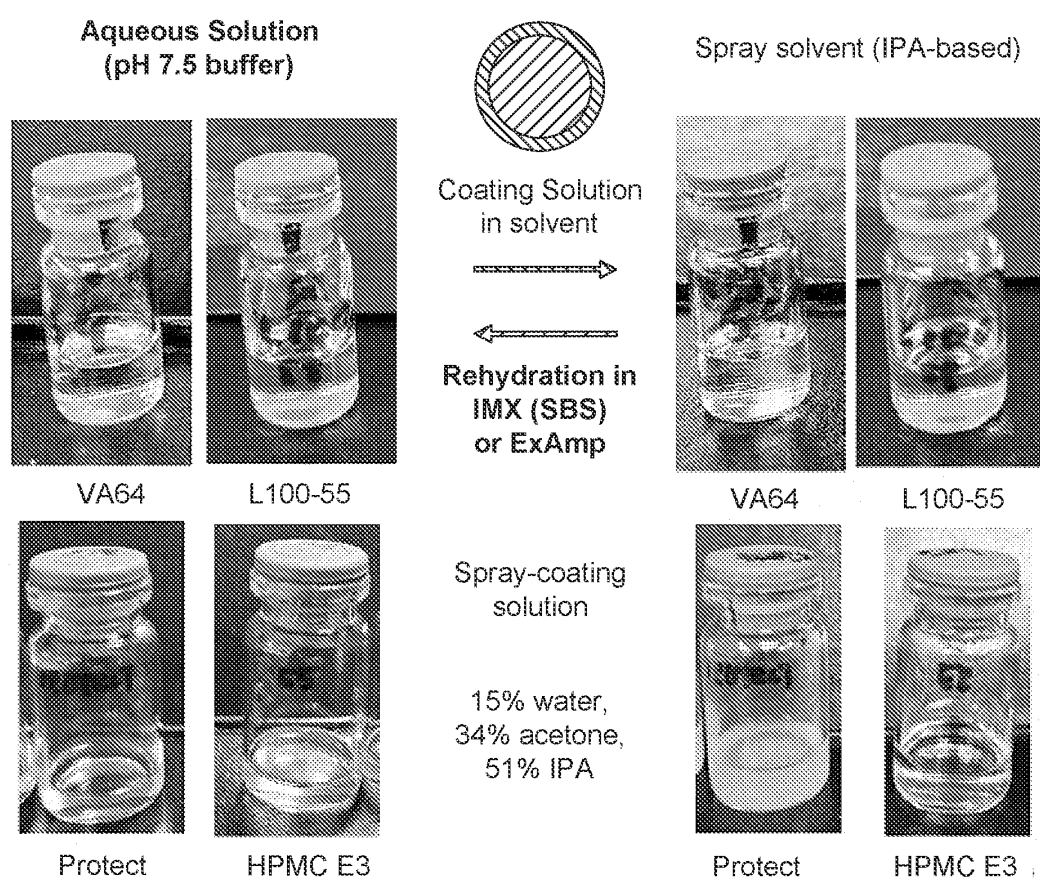


FIG. 36

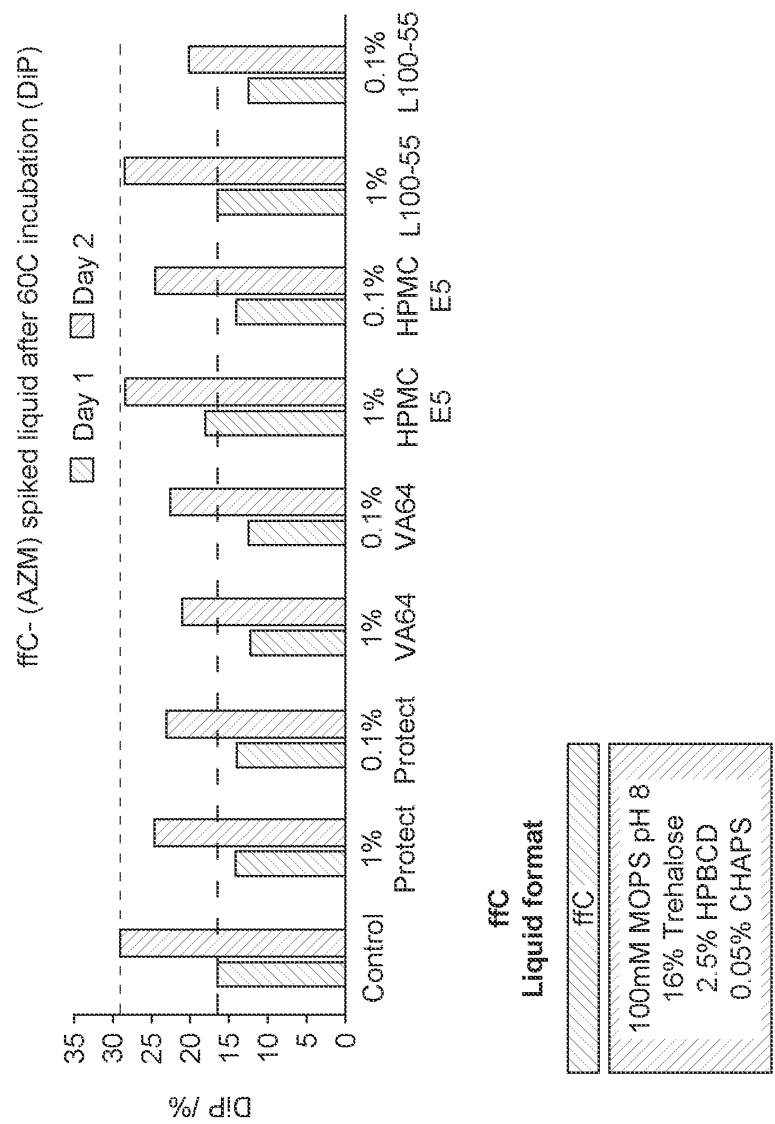


FIG. 37A

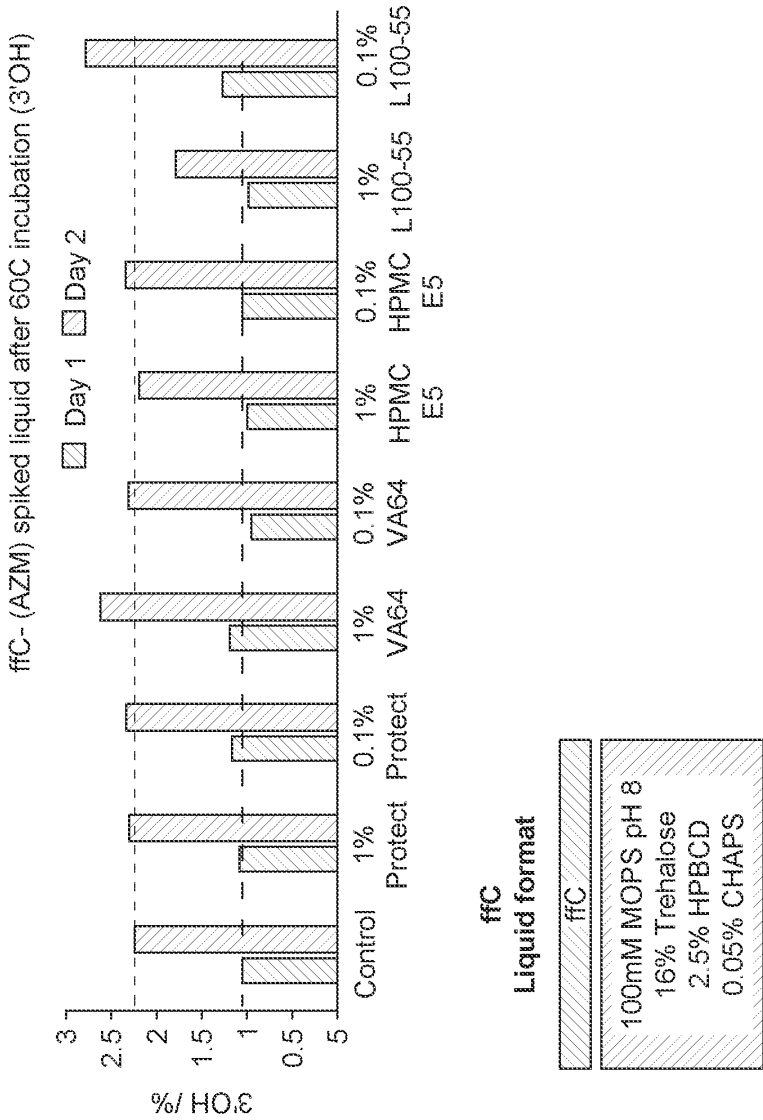


FIG. 37B

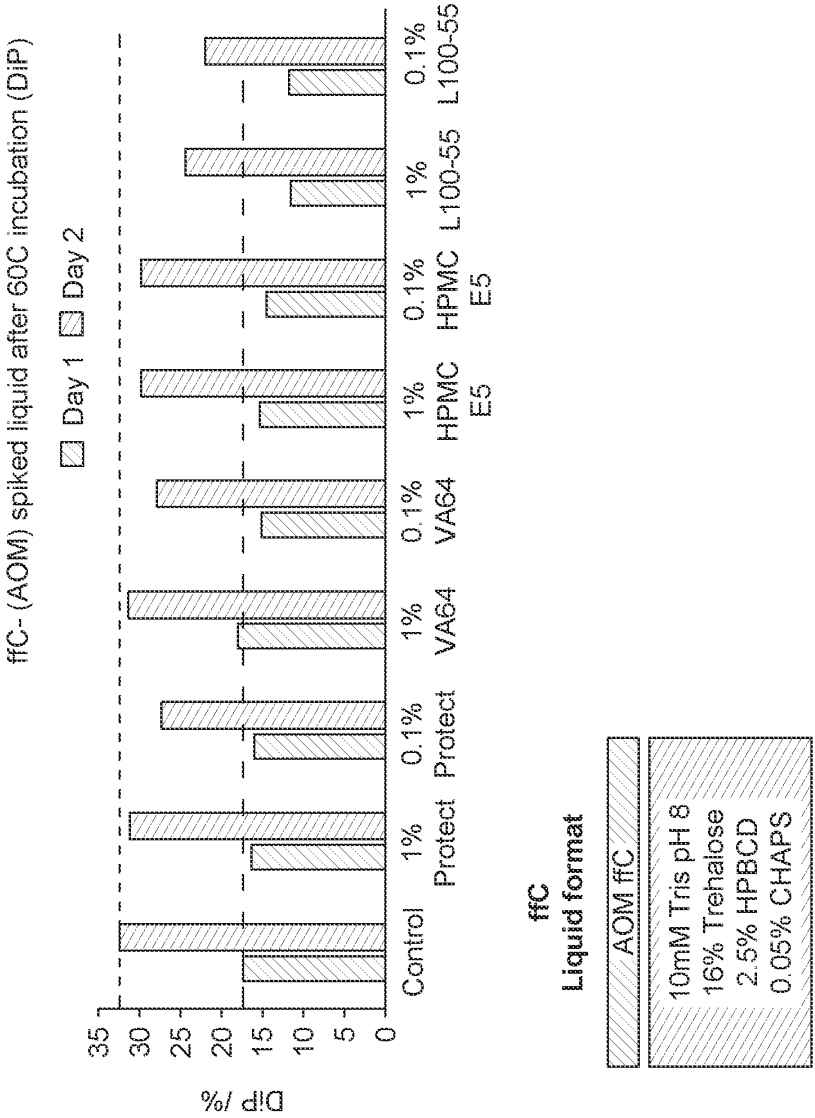


FIG. 37C

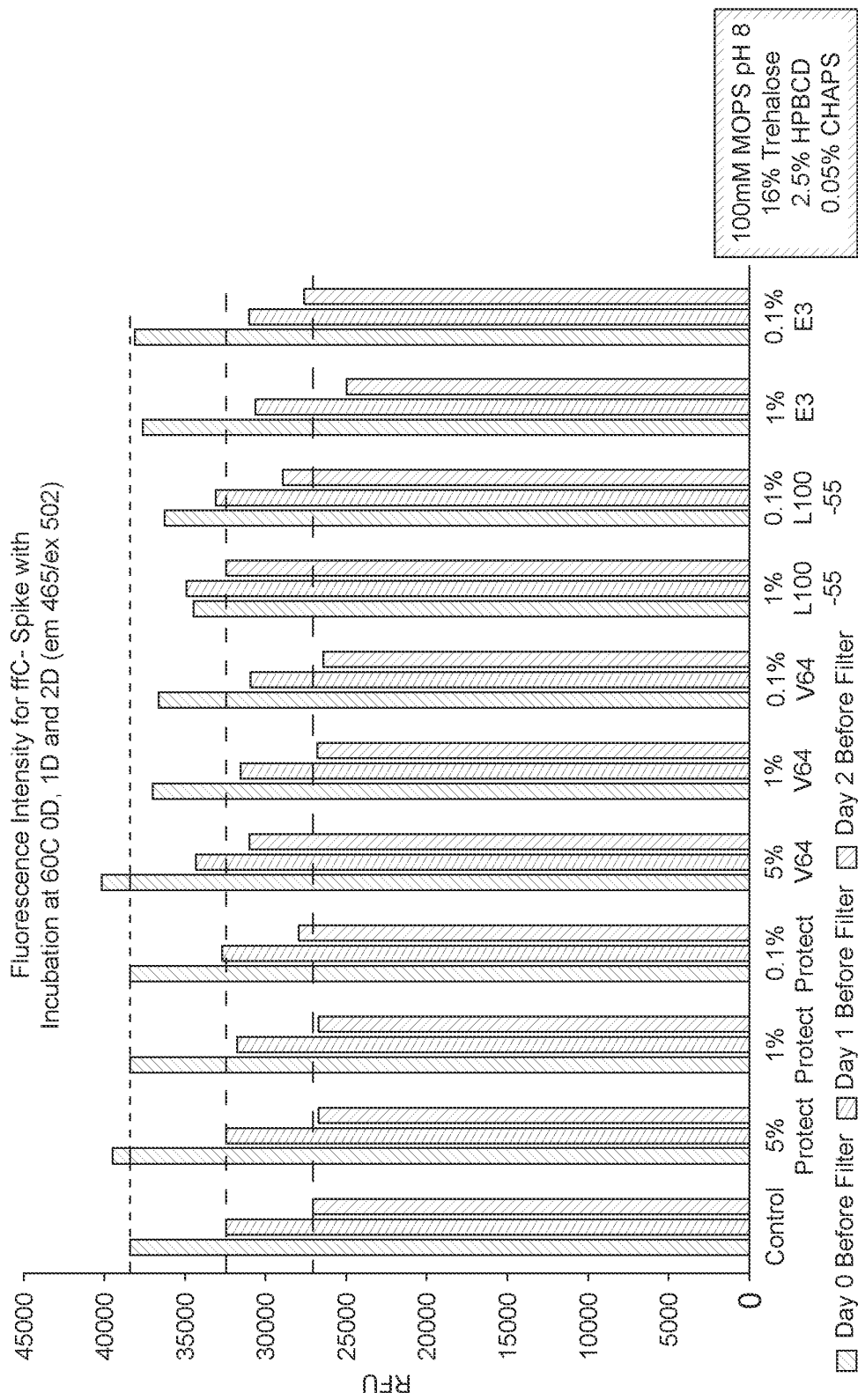


FIG. 38

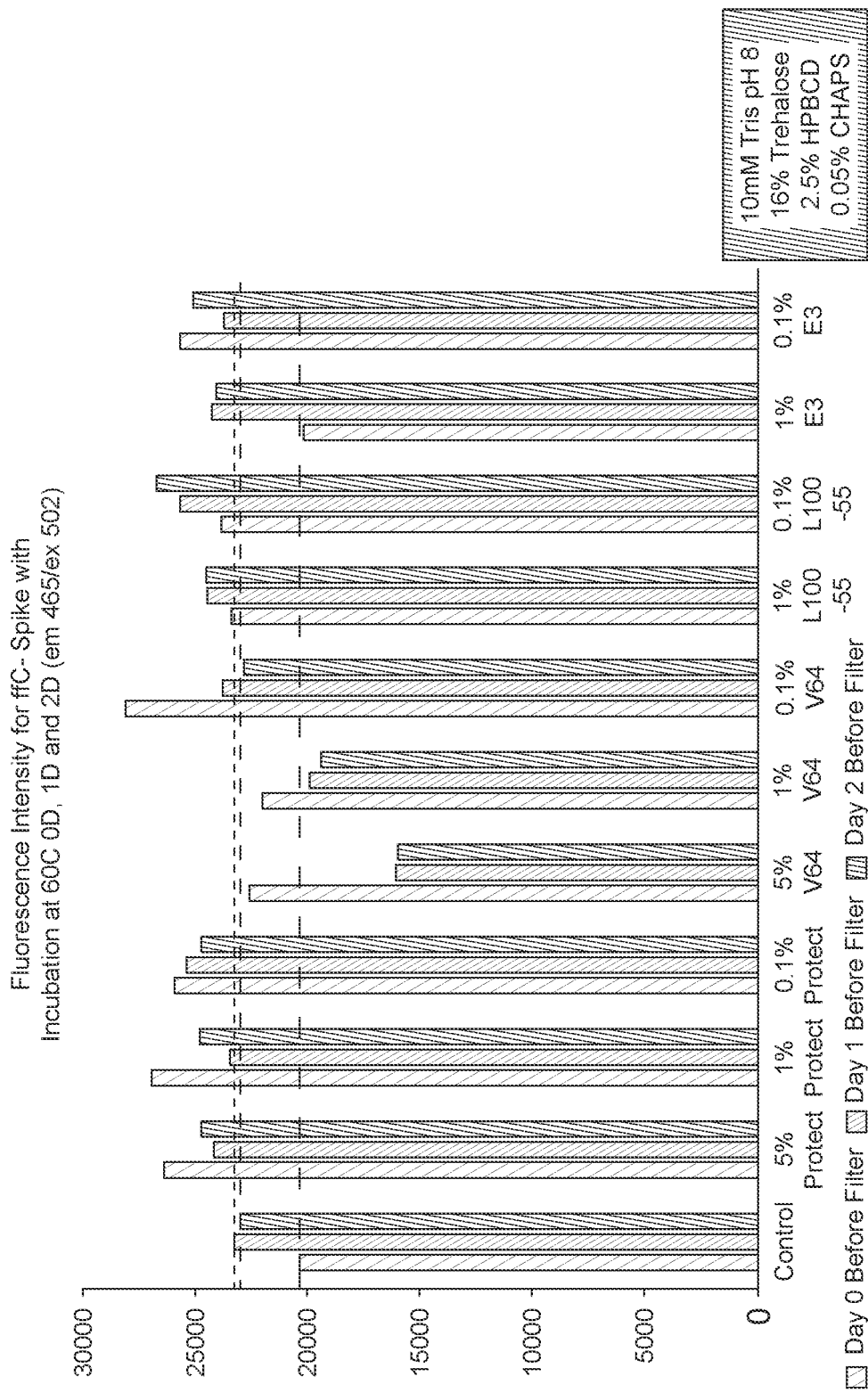


FIG. 39

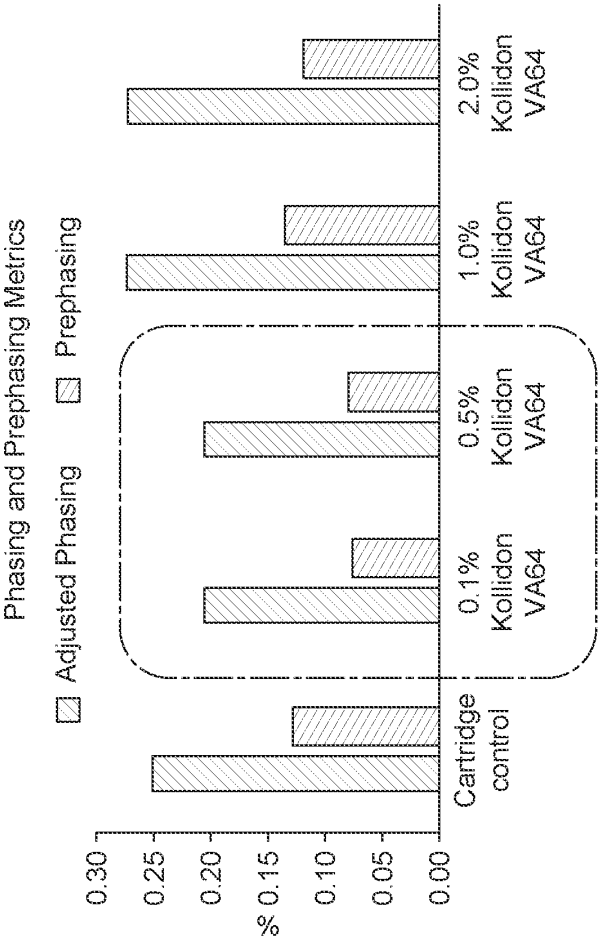


FIG. 40A

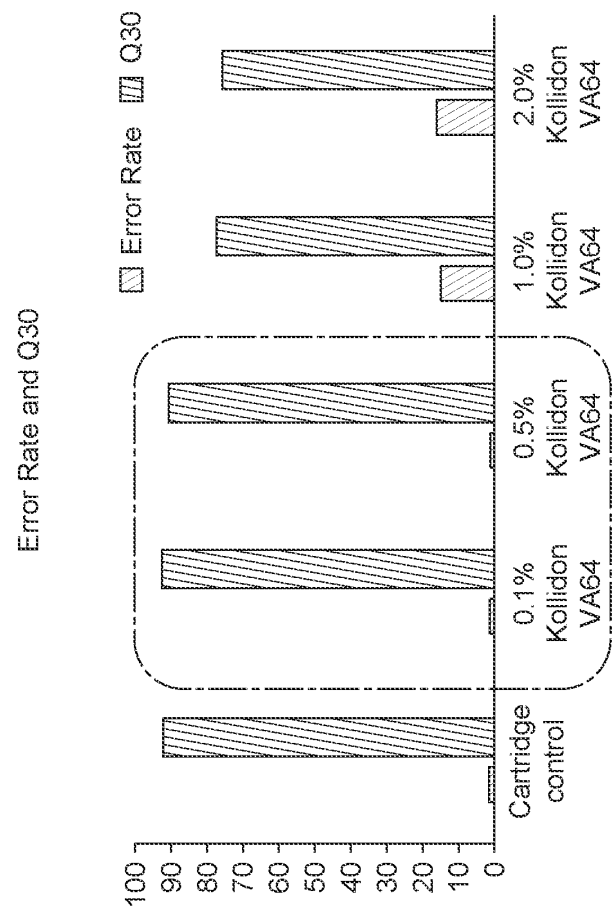


FIG. 40B

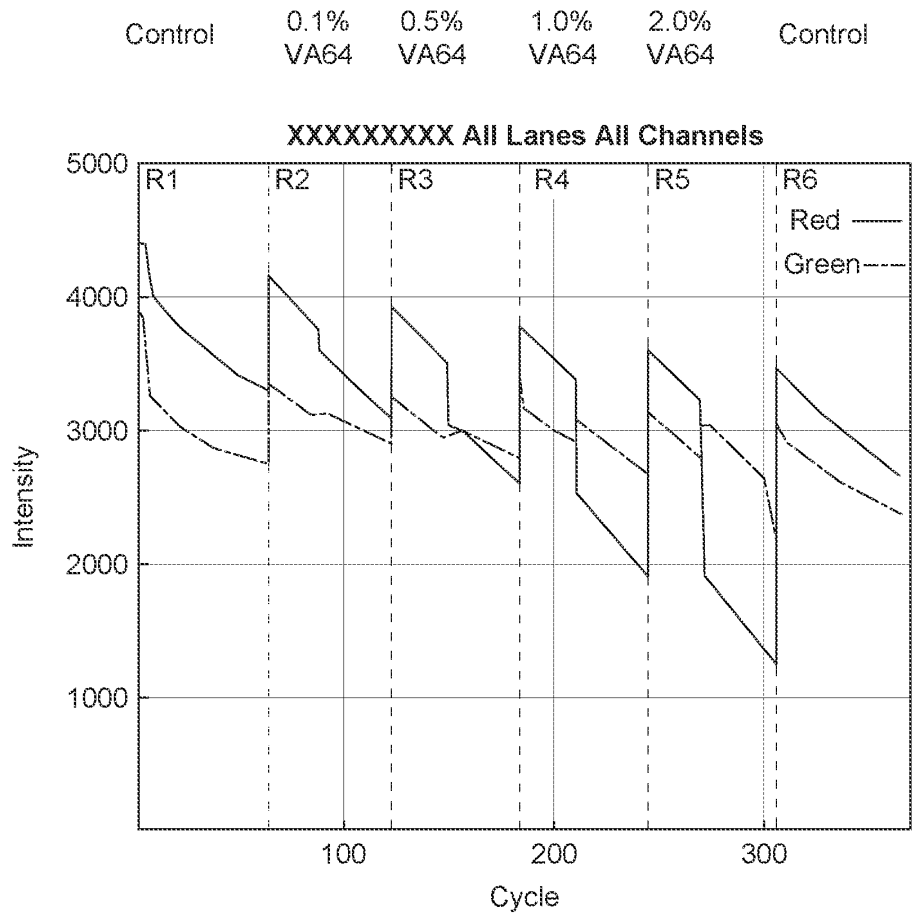


FIG. 40C

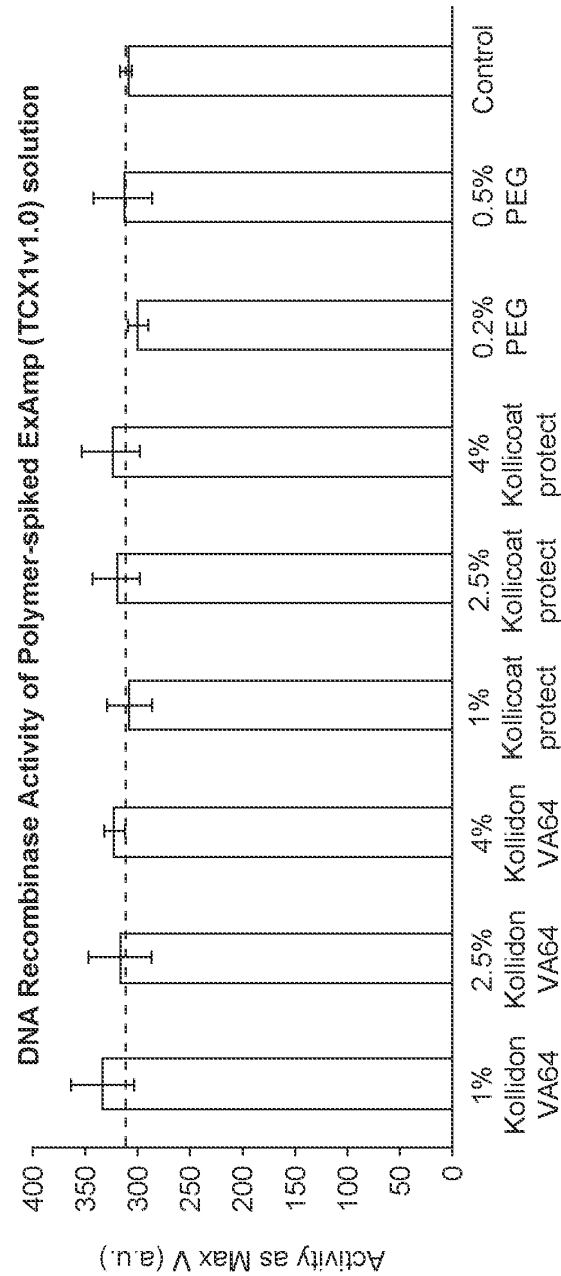


FIG. 41A

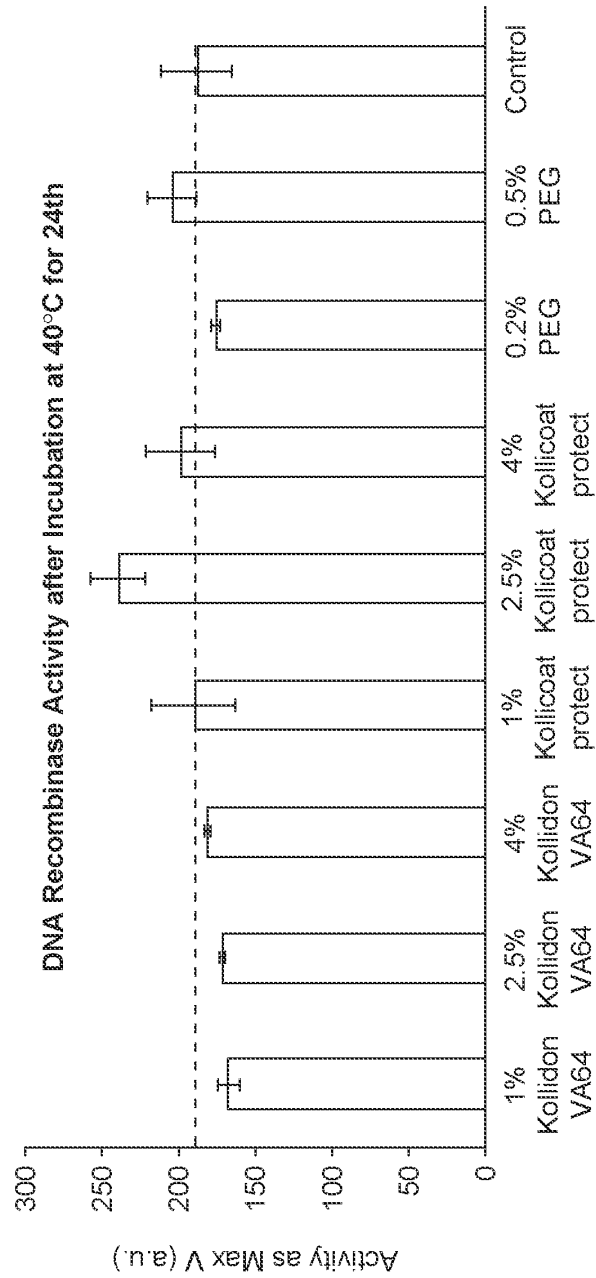


FIG. 41B

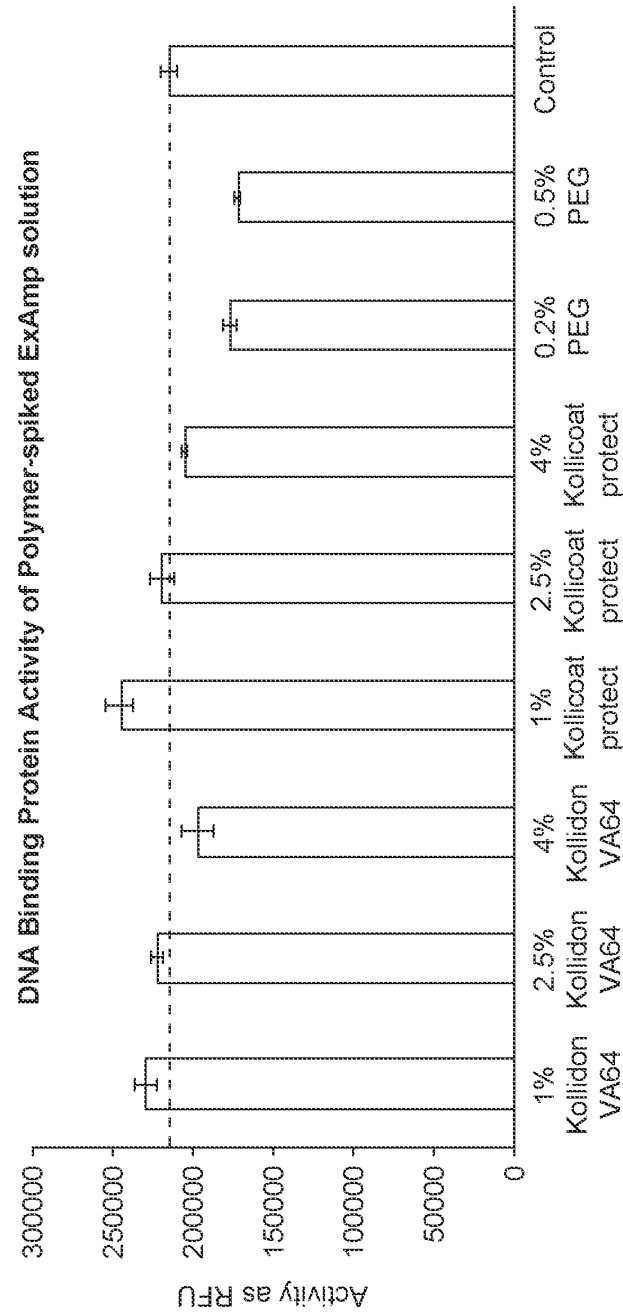


FIG. 42A

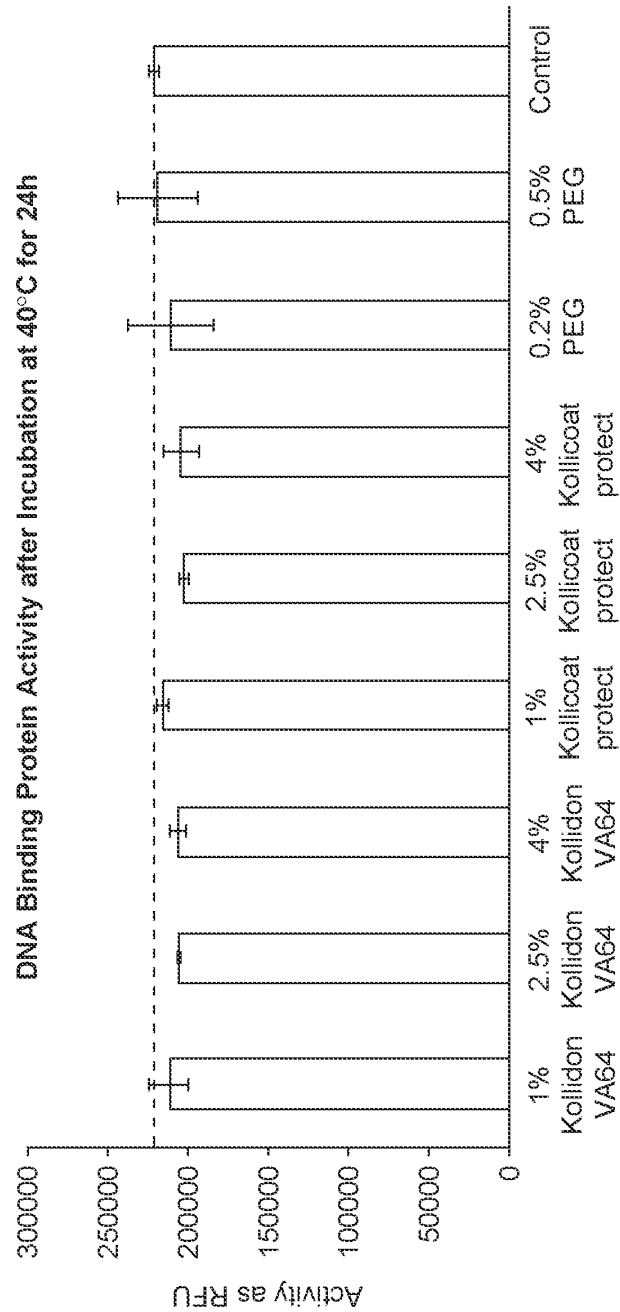


FIG. 42B

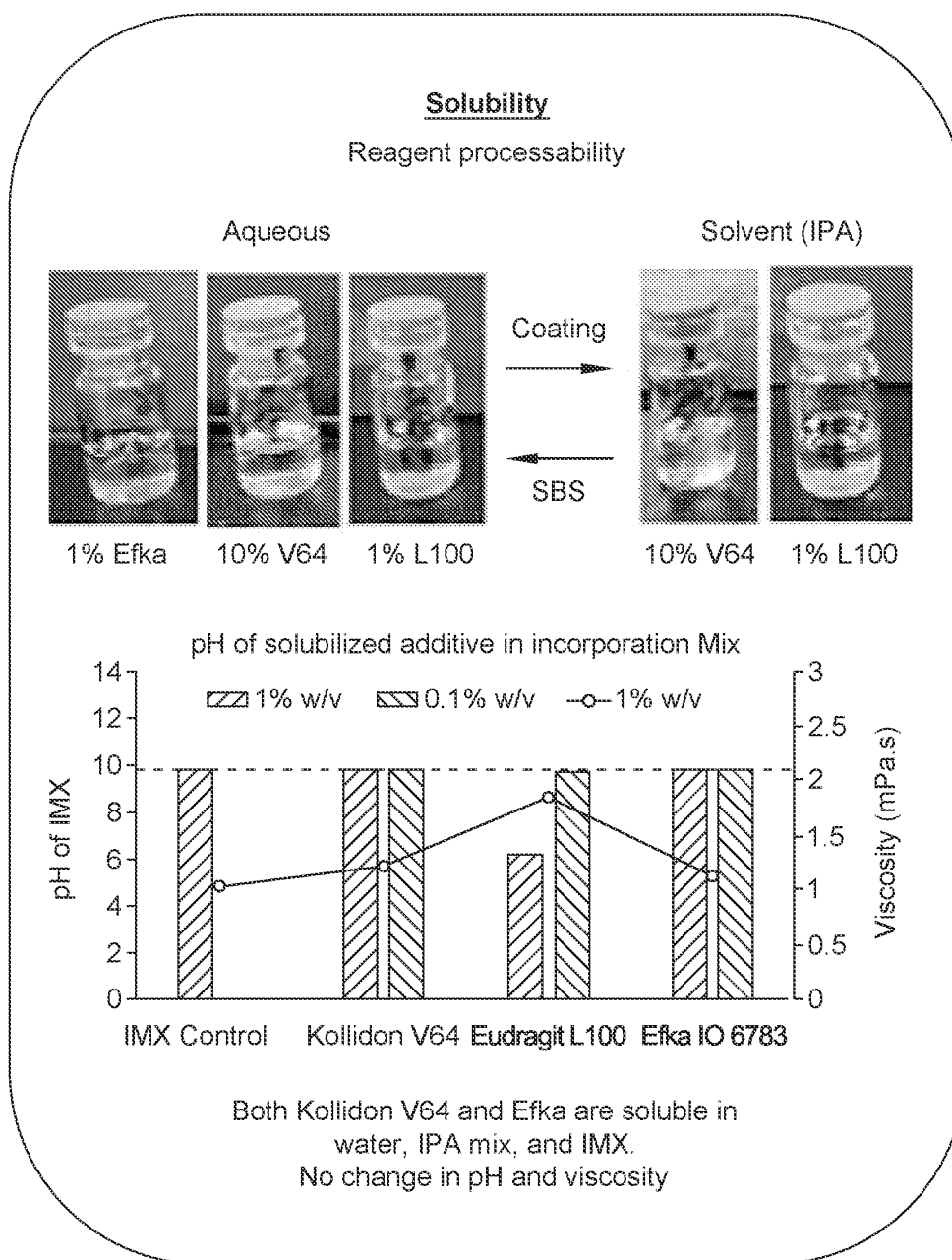


FIG. 43A

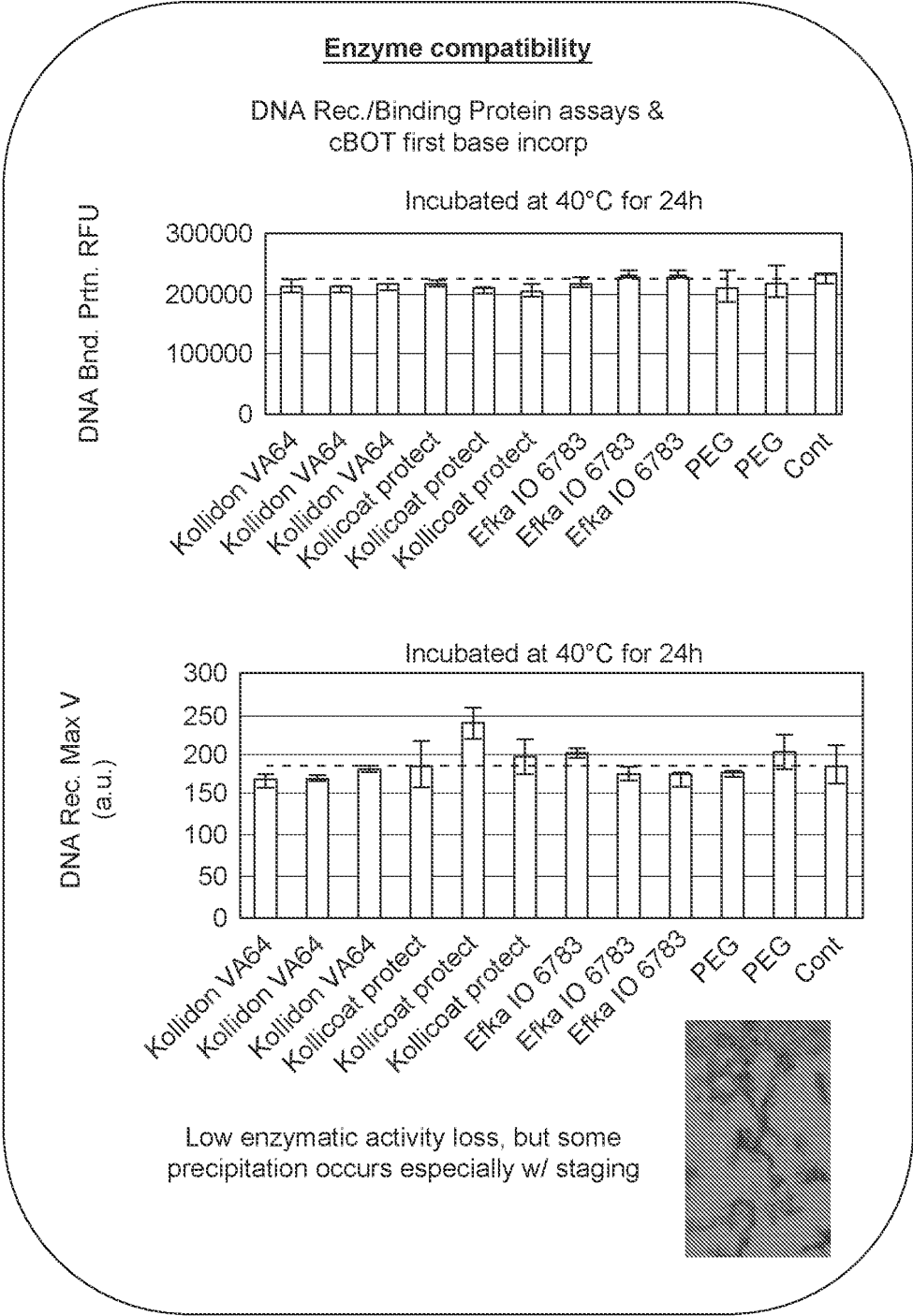


FIG. 43B

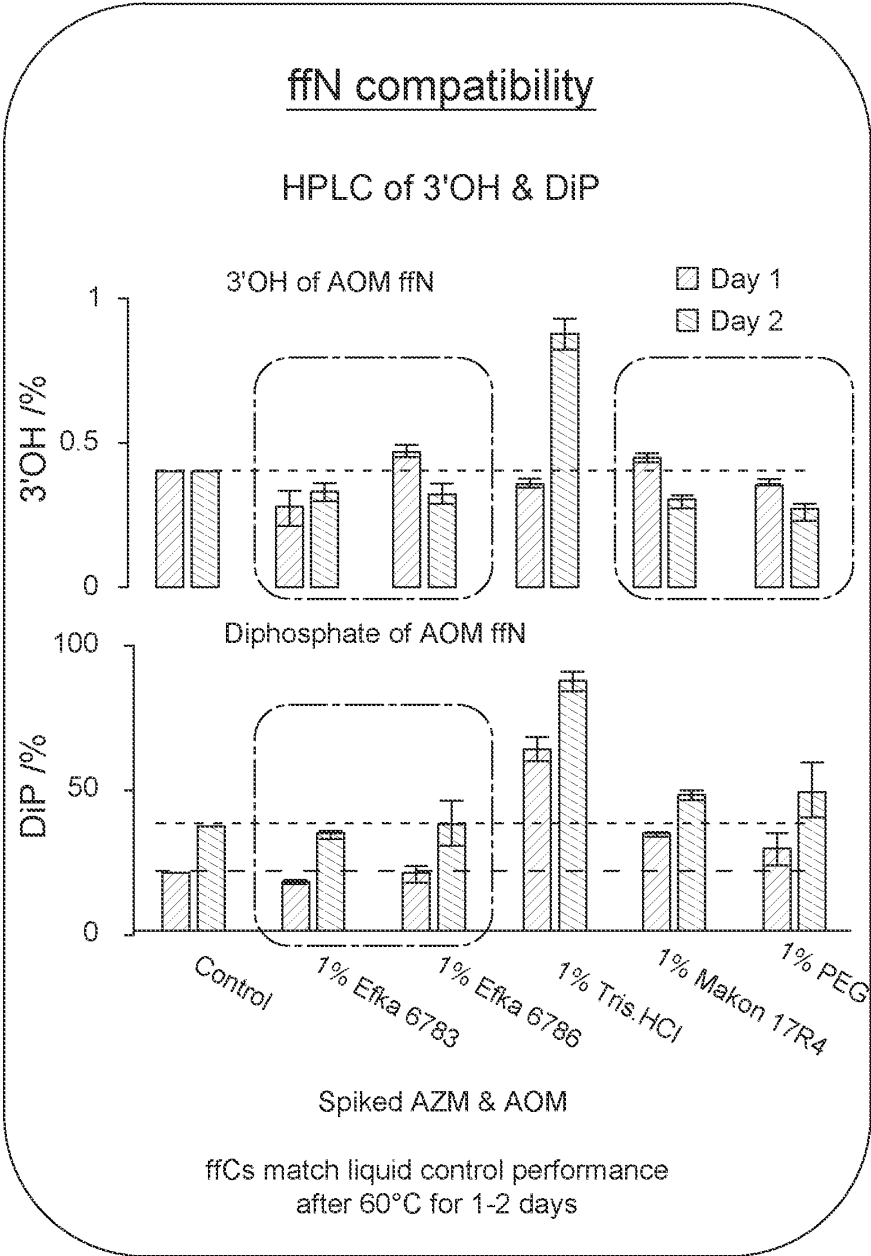


FIG. 43C

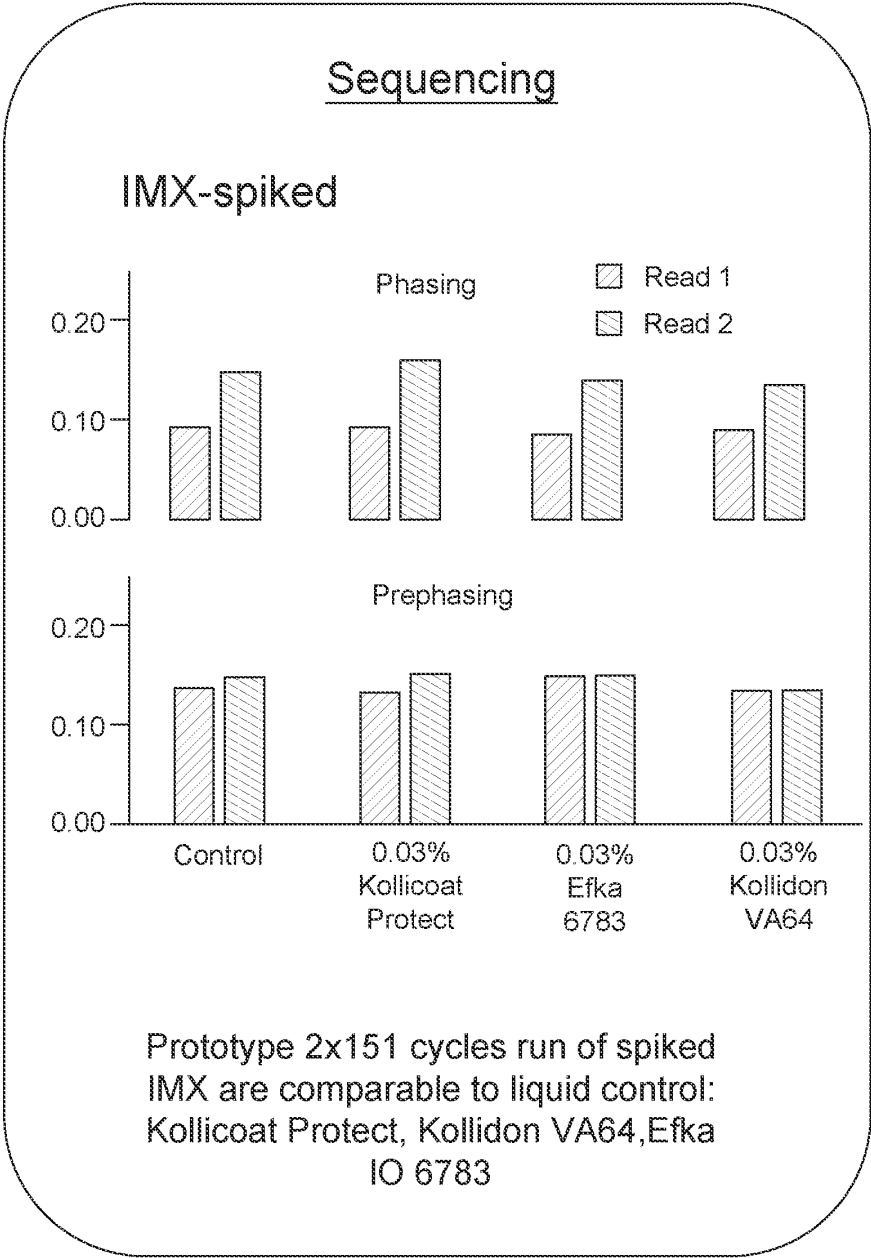


FIG. 43D

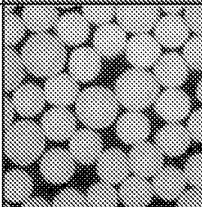
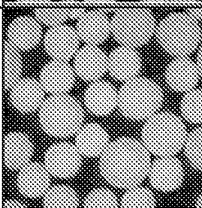
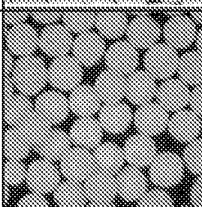
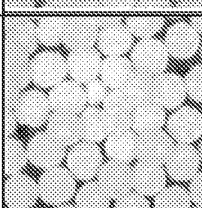
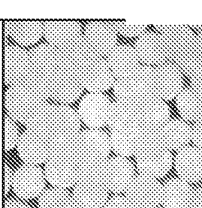
|                                  | ffN                                                                                 |                                                                                     |                                                                                    |                                                                                   | DNA Recombinase / BSA                                                             |                                                                                   |
|----------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Coating                          | Formulation A                                                                       | Formulation B                                                                       | Formulation C                                                                      | Formulation D                                                                     | Formulation A                                                                     | Formulation C                                                                     |
|                                  |  |  |  |  |  |  |
| Yield (%)                        | 95                                                                                  | 80                                                                                  | 100                                                                                | 100                                                                               | 94                                                                                | 88                                                                                |
| Loss on drying                   | 3.77                                                                                | 3.91                                                                                | 5.99                                                                               | 5.12                                                                              | 2.76                                                                              | 3.03                                                                              |
| Res. Moisture (%RH)              | 0.90                                                                                | 0.42                                                                                | 0.51                                                                               | 0.35                                                                              | 0.72                                                                              | 0.34                                                                              |
| Rehydration                      |                                                                                     |                                                                                     |                                                                                    |                                                                                   | Instant                                                                           | Instant                                                                           |
| Foam                             | Dissipates by 1 mins                                                                | Dissipates by 3.5 mins                                                              | Dissipates by 1.5 mins                                                             | Dissipates by 3 mins                                                              | Dissipates by 0.5 min                                                             | No foam                                                                           |
| Precipitates                     | No                                                                                  | No                                                                                  | No                                                                                 | No                                                                                | No                                                                                | dissolves <30s                                                                    |
| Size distribution (0.5, $\mu$ m) | 414.6                                                                               | 392.5                                                                               | 268.2                                                                              | 367.9                                                                             | 378.6                                                                             | 362.5                                                                             |
| Trib. Affinity (nC/g)            | 3.35                                                                                | 3.76                                                                                | -0.912                                                                             | 1.24                                                                              | -0.0117                                                                           | -0.71                                                                             |

FIG. 44

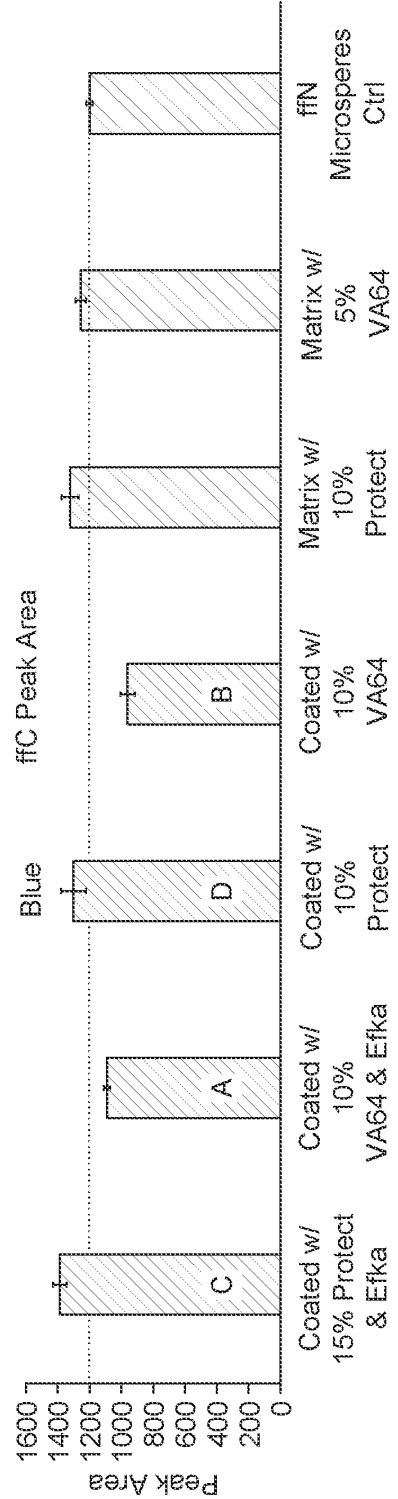


FIG. 45A

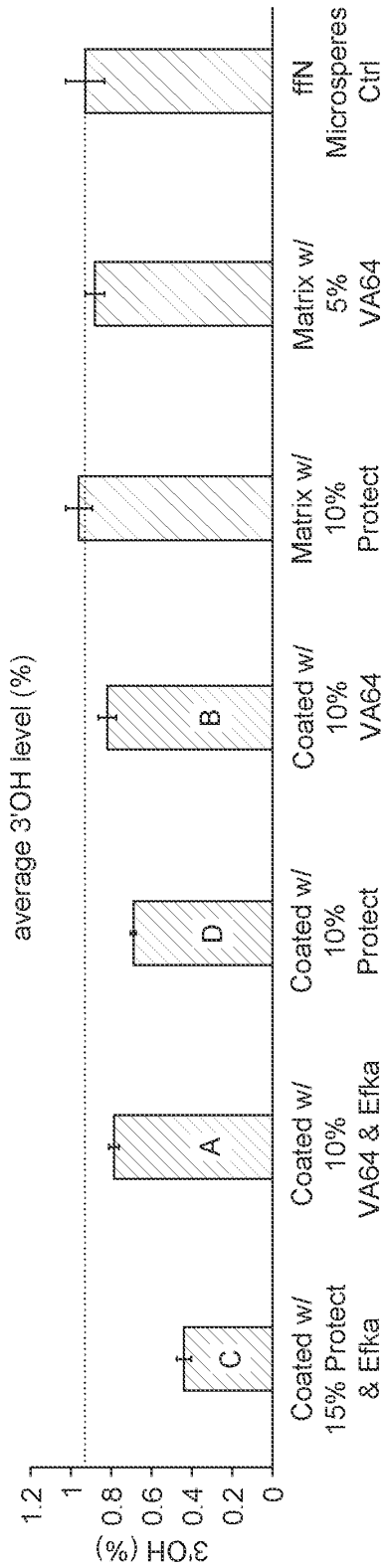


FIG. 45B

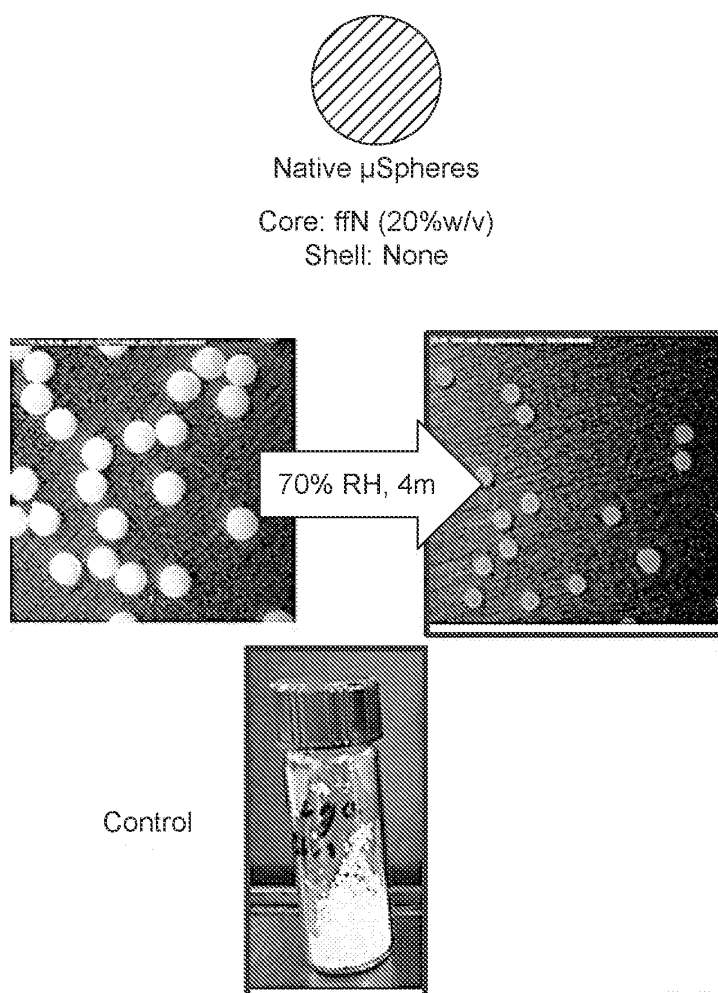


FIG. 46A

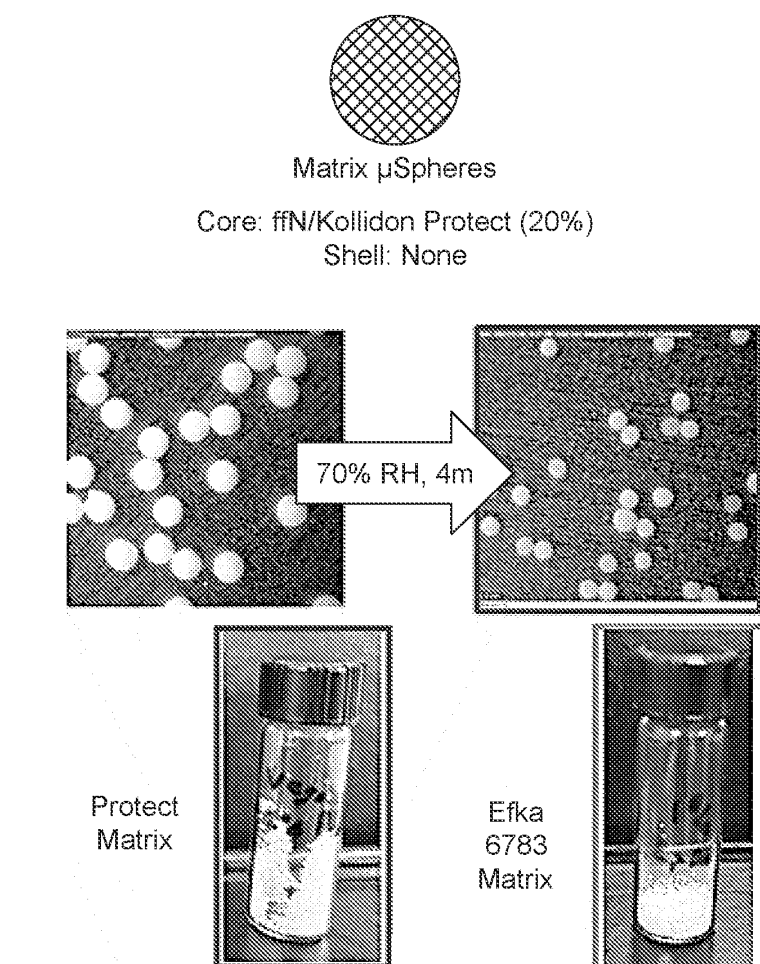


FIG. 46B

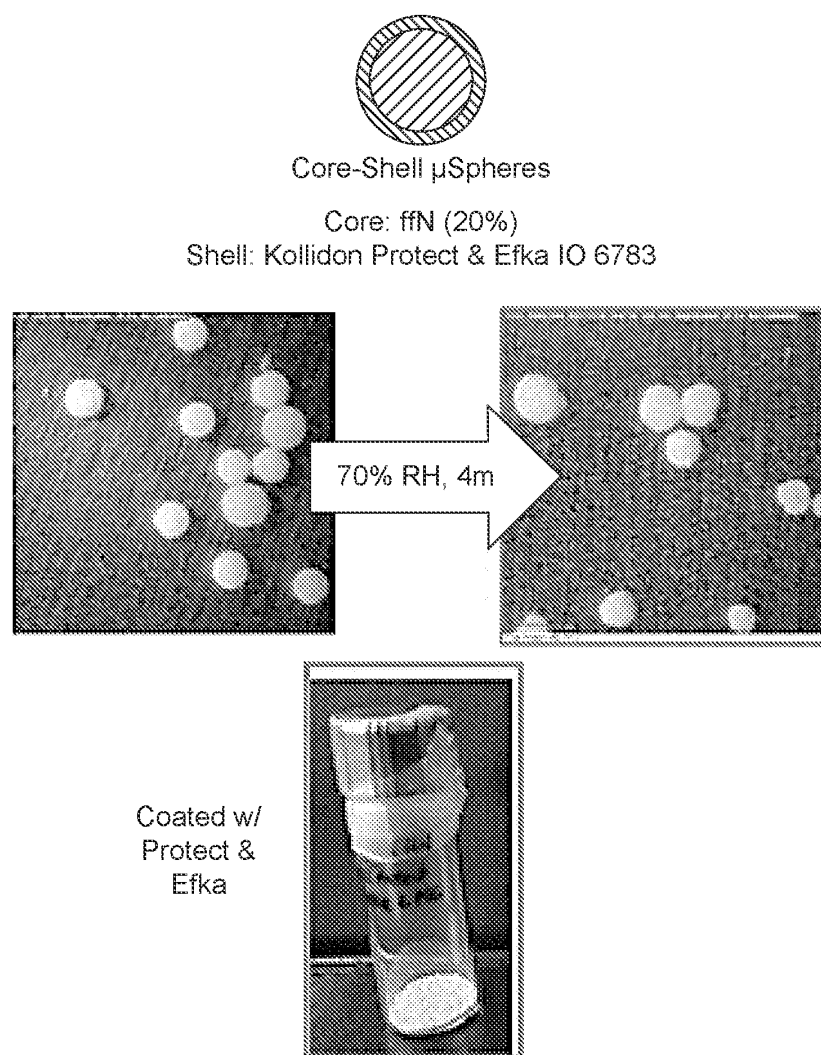


FIG. 46C

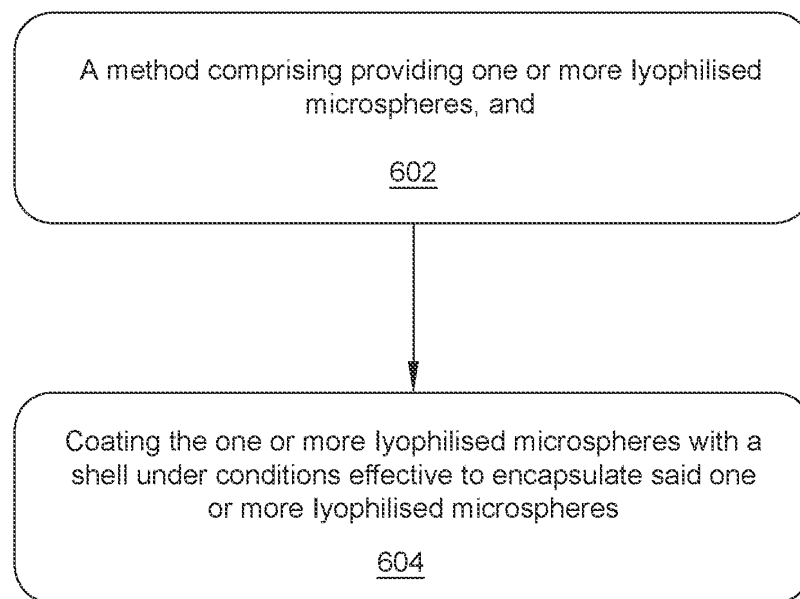


FIG. 47

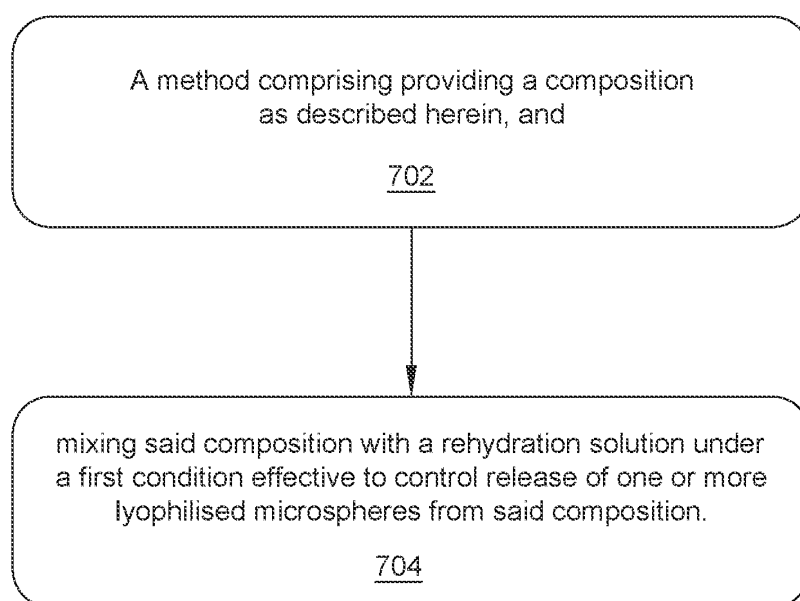


FIG. 48

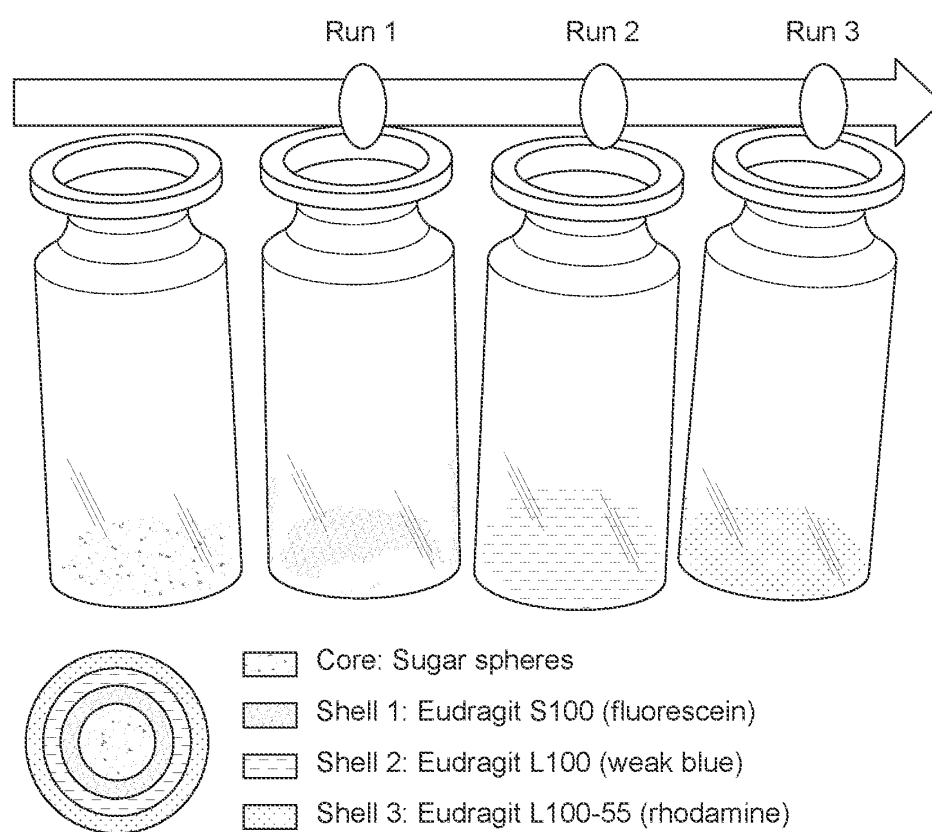


FIG. 49A

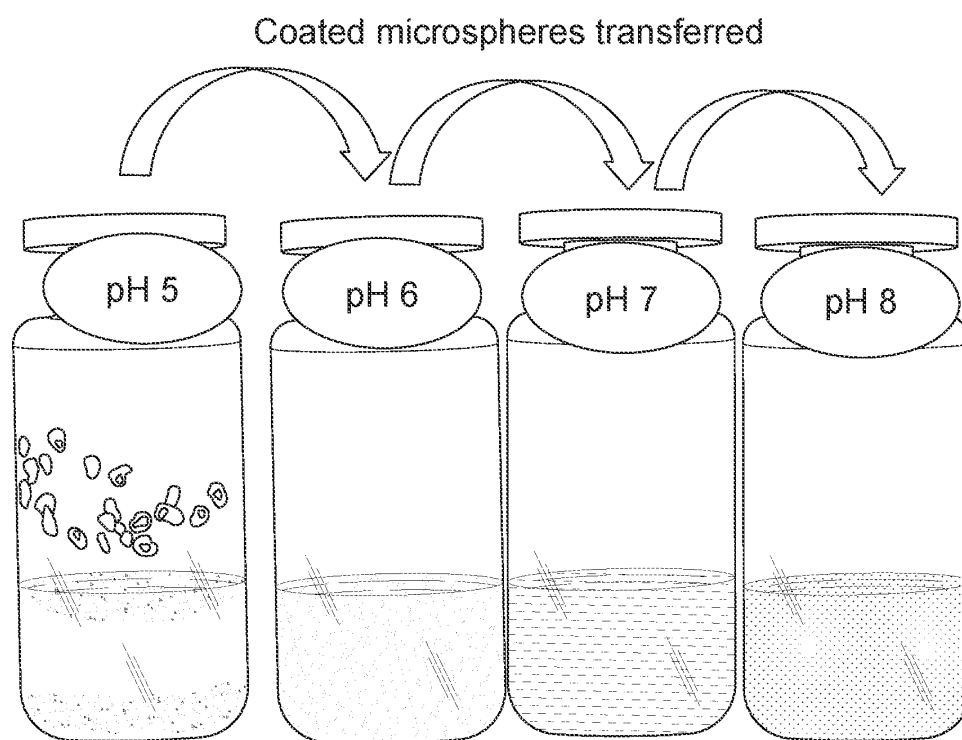


FIG. 49B

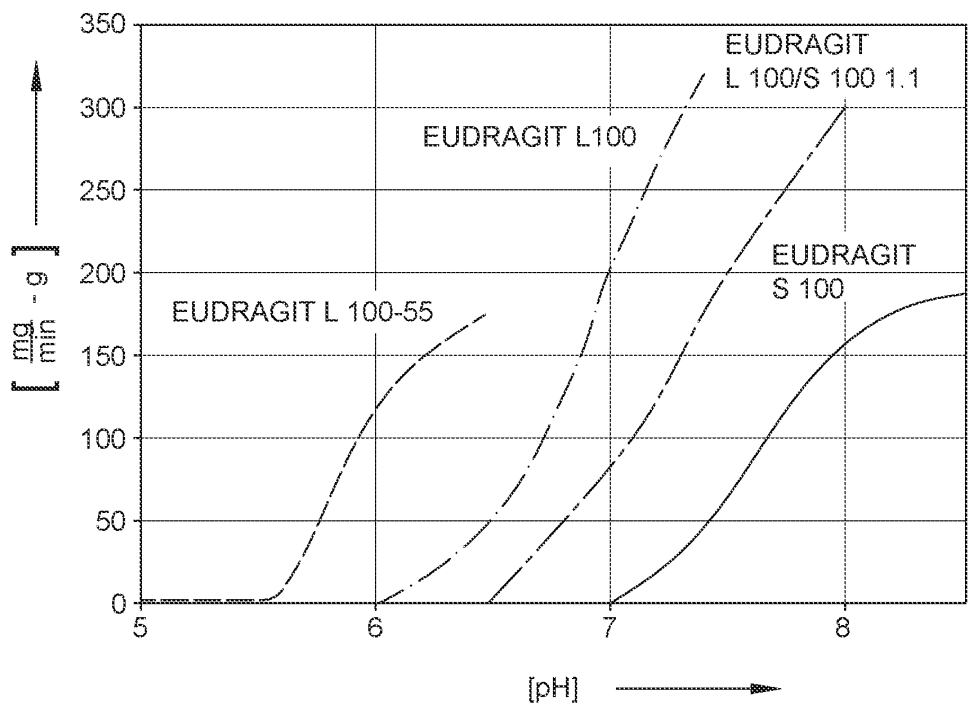


FIG. 49C