

1/19

FIG. 1

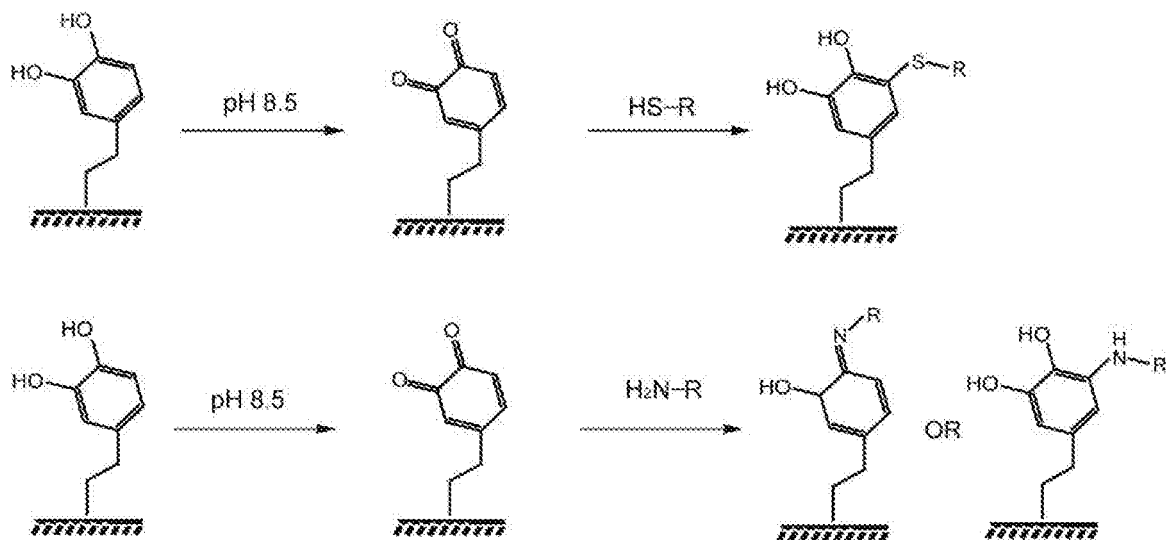
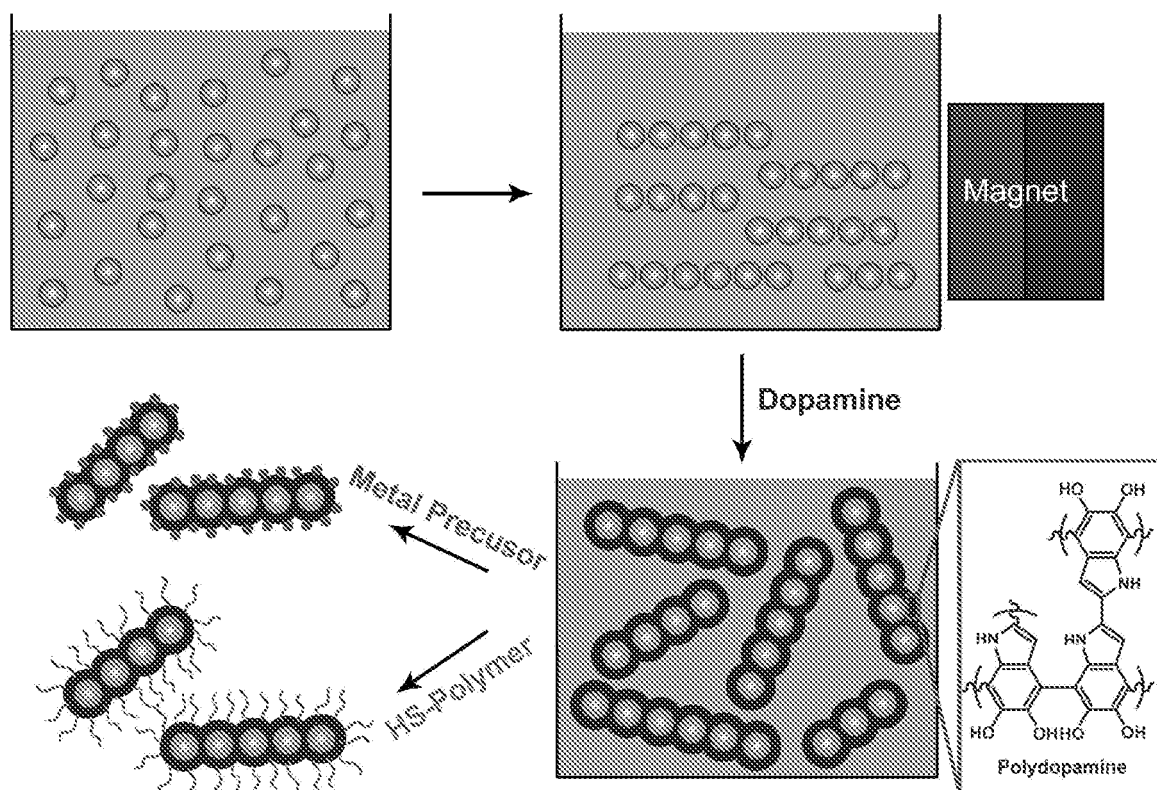


FIG. 2



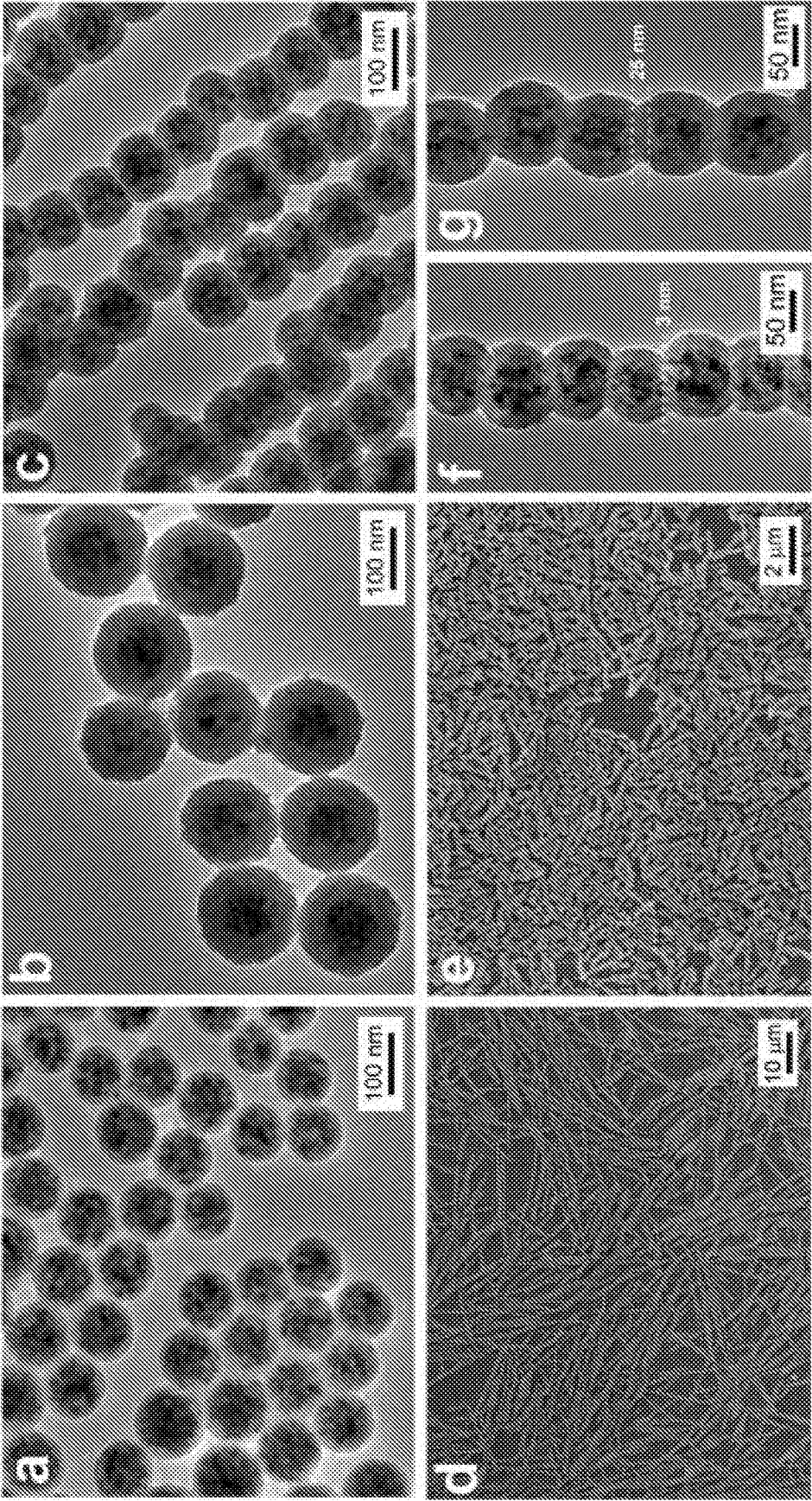
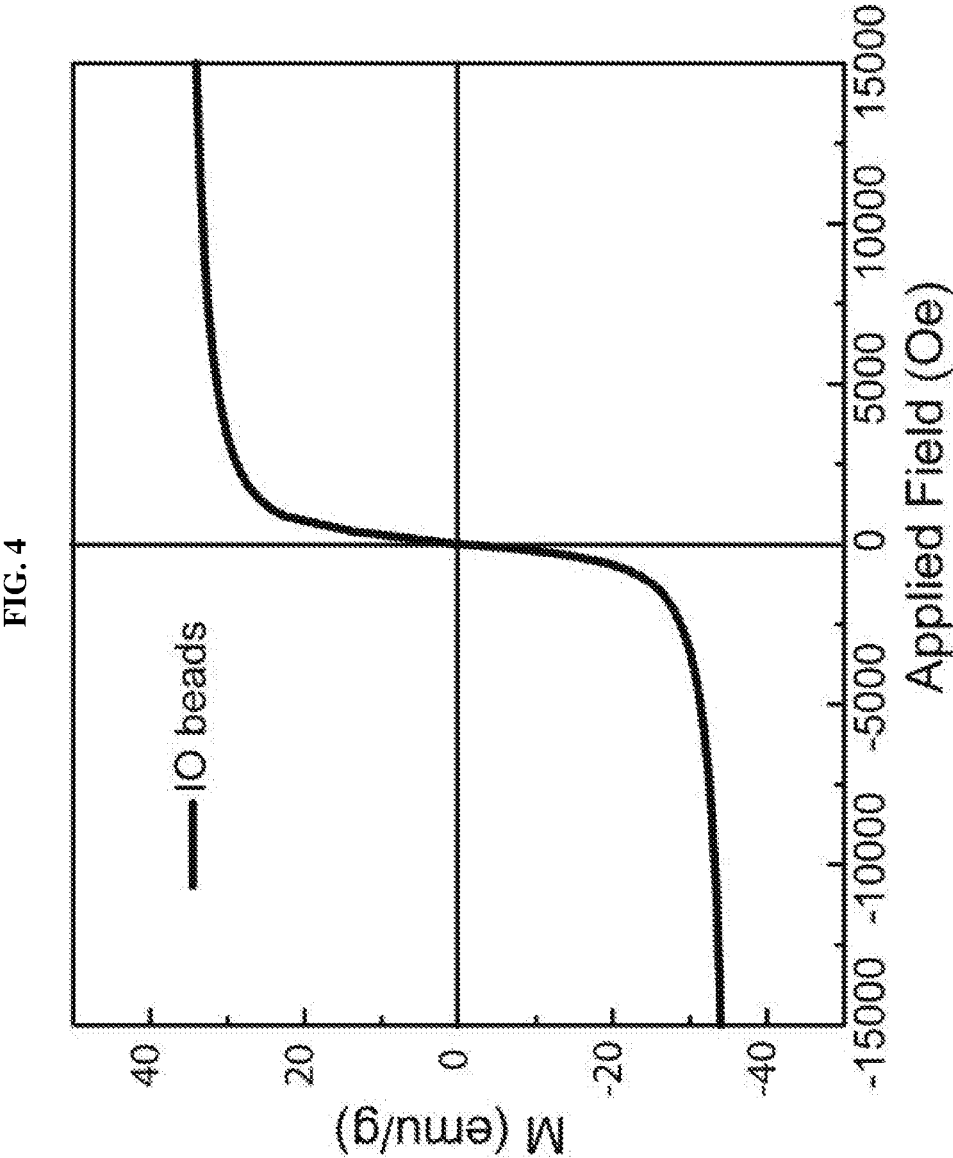
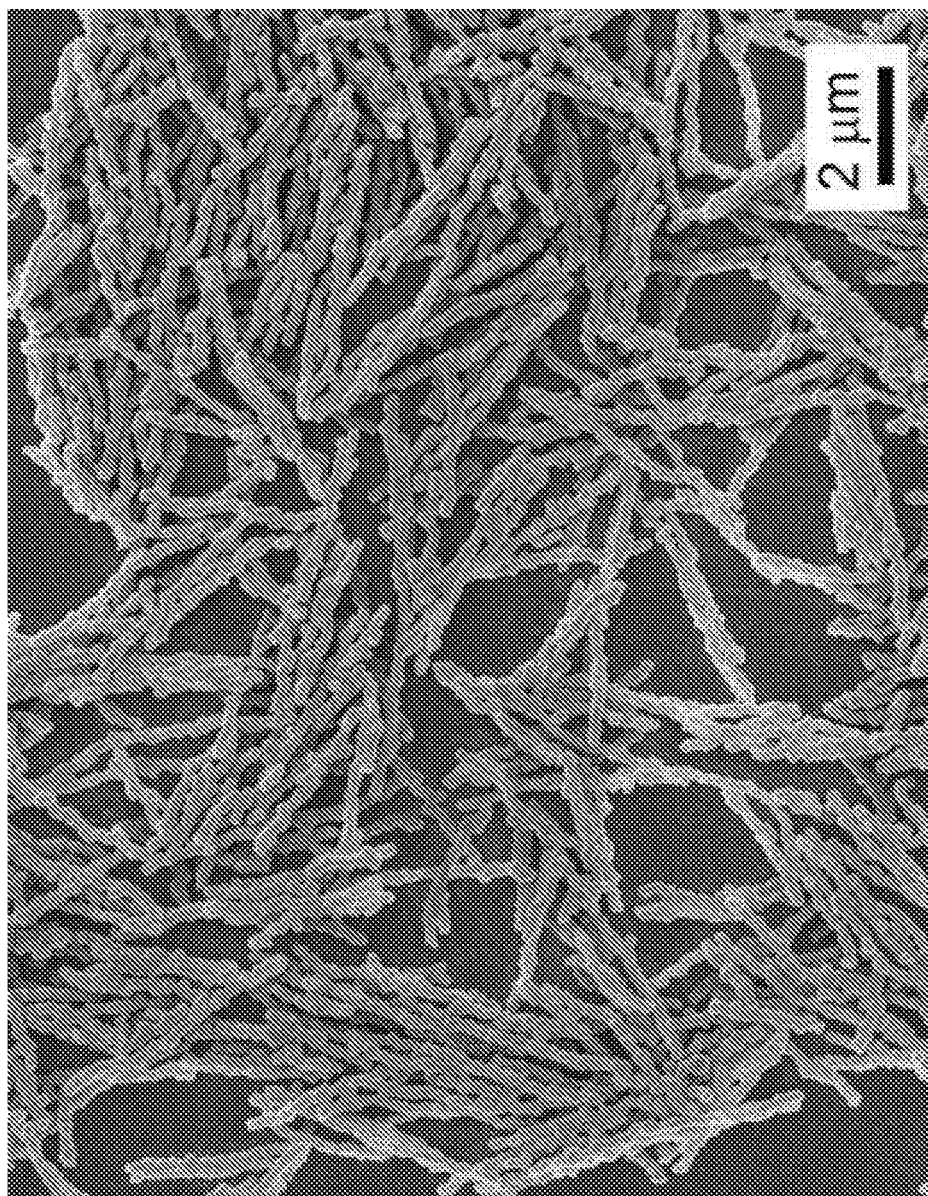


FIG. 3



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FIG. 5



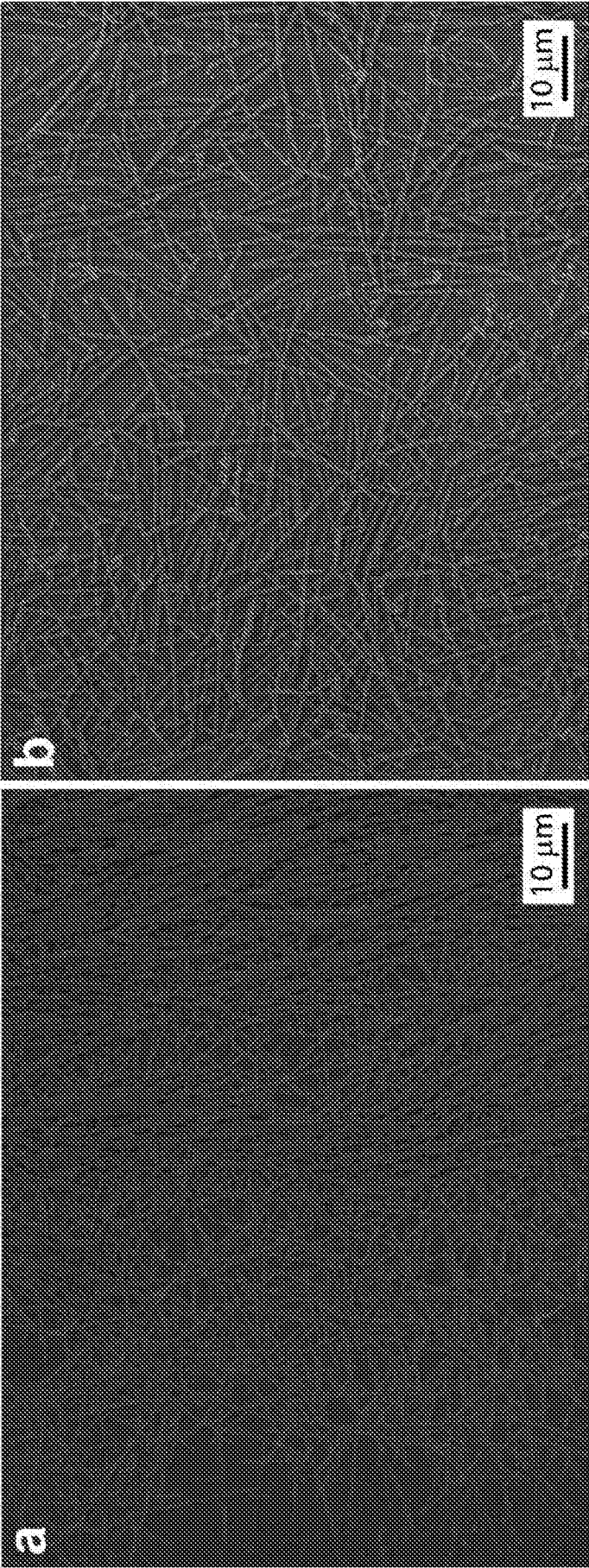
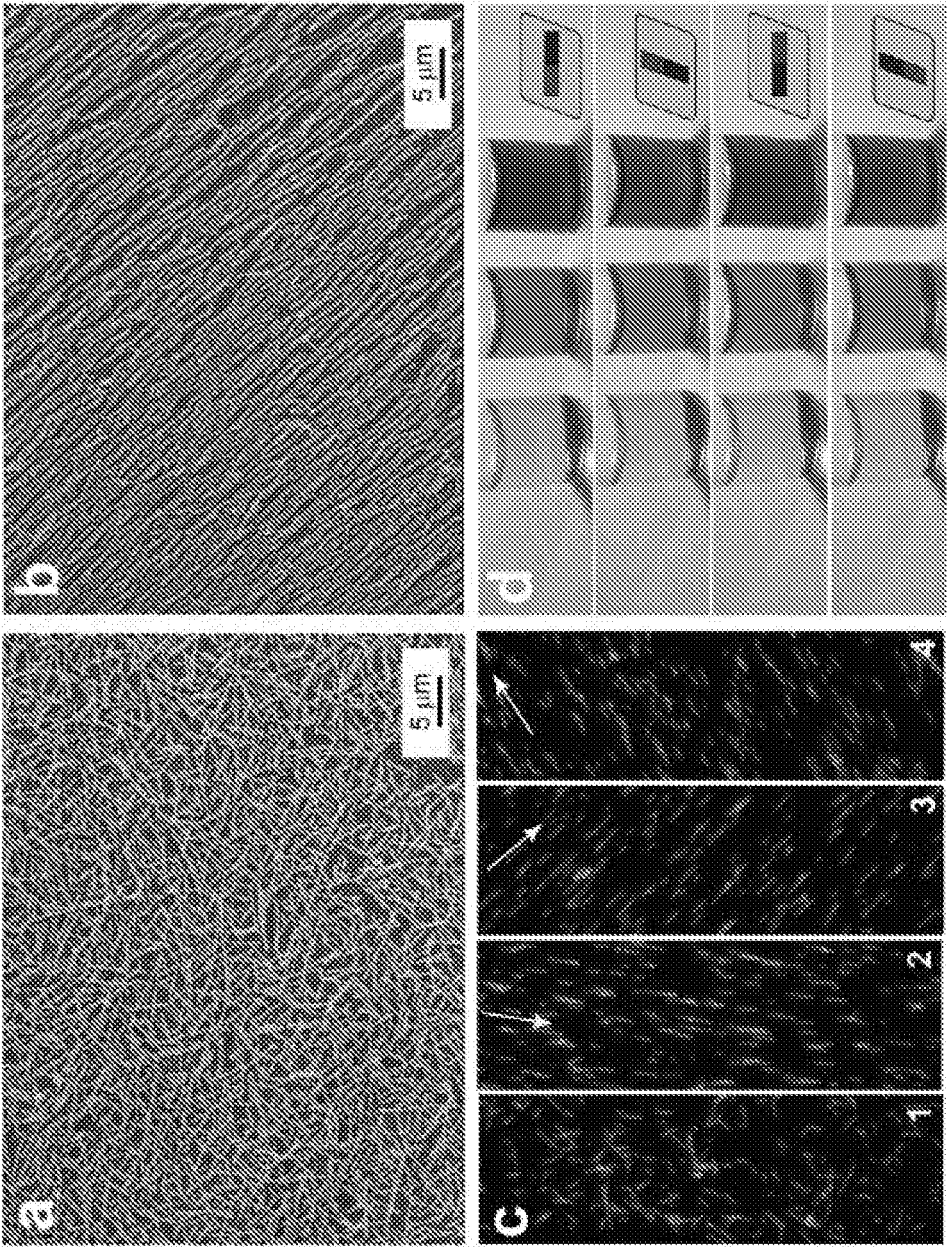


FIG. 6

FIG. 7



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FIG. 8

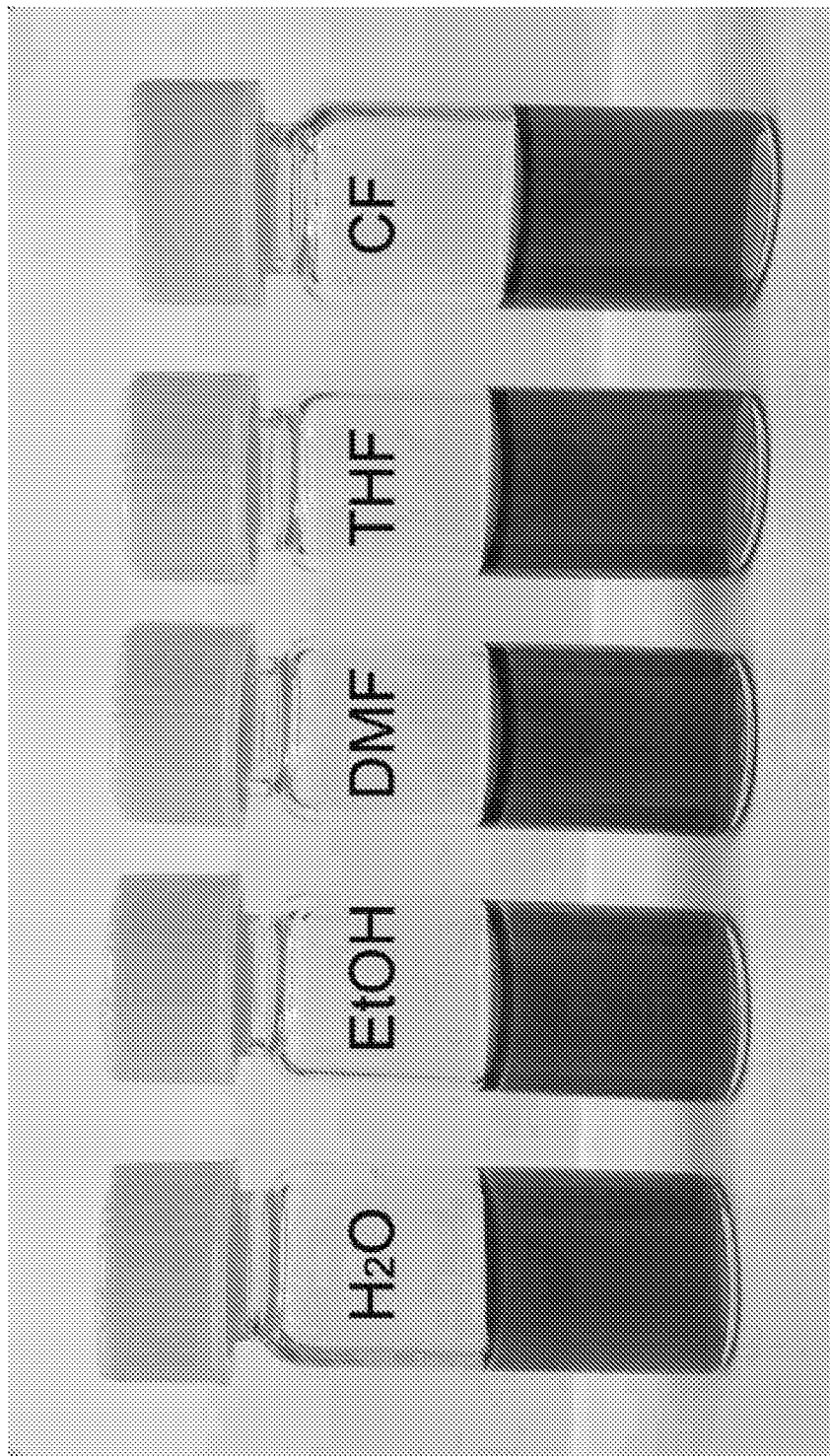
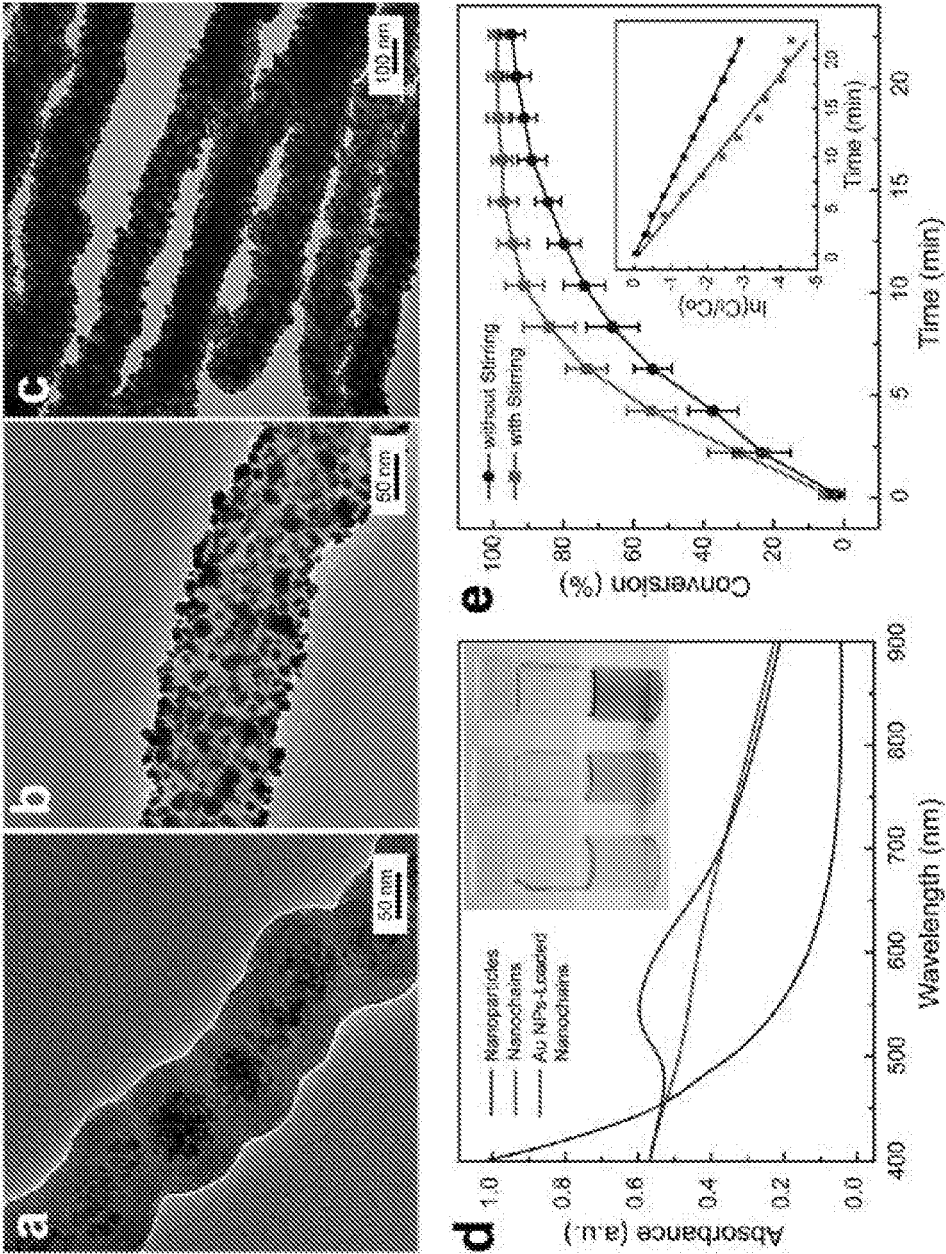
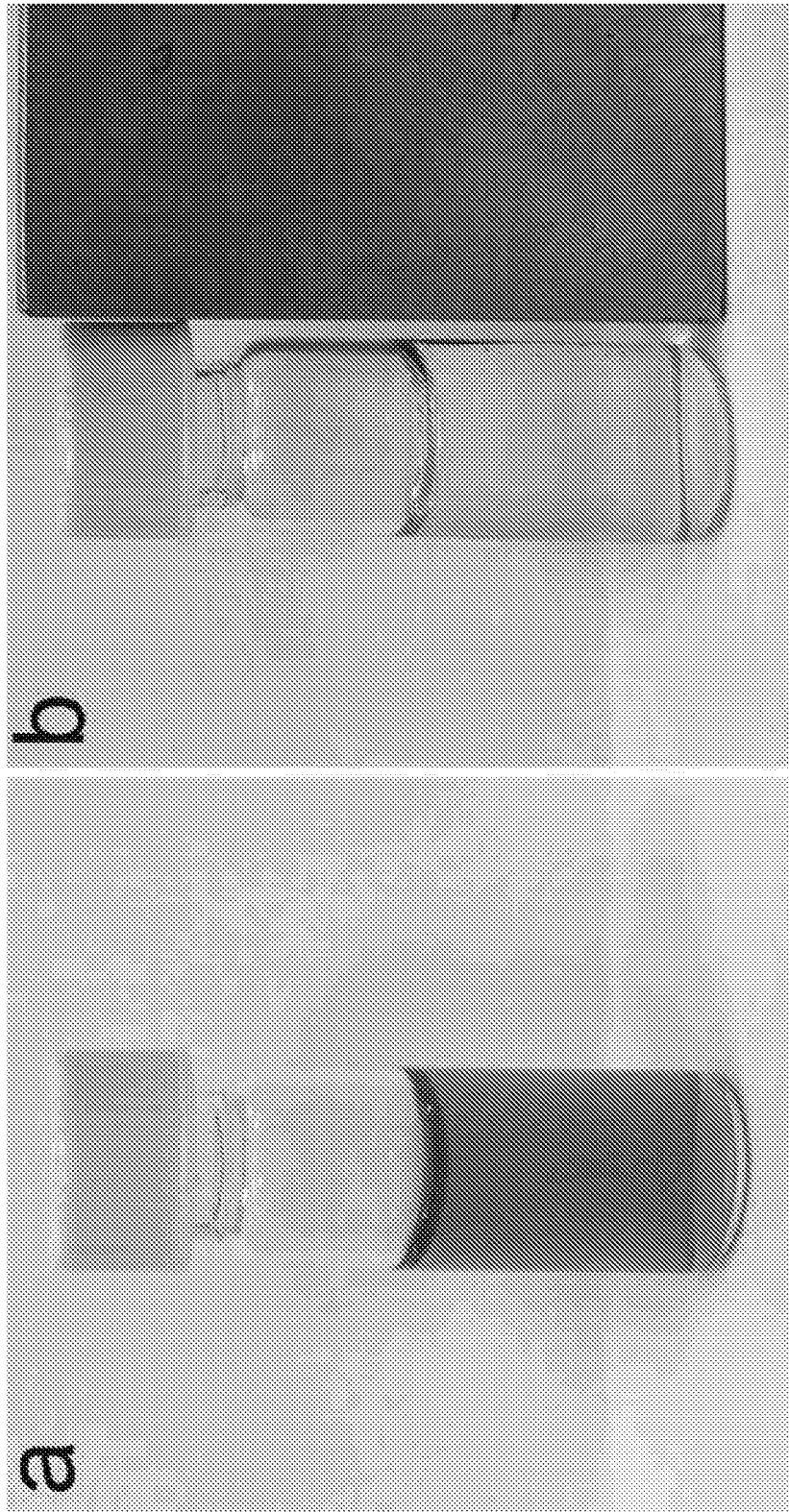


FIG. 9



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FIG. 10



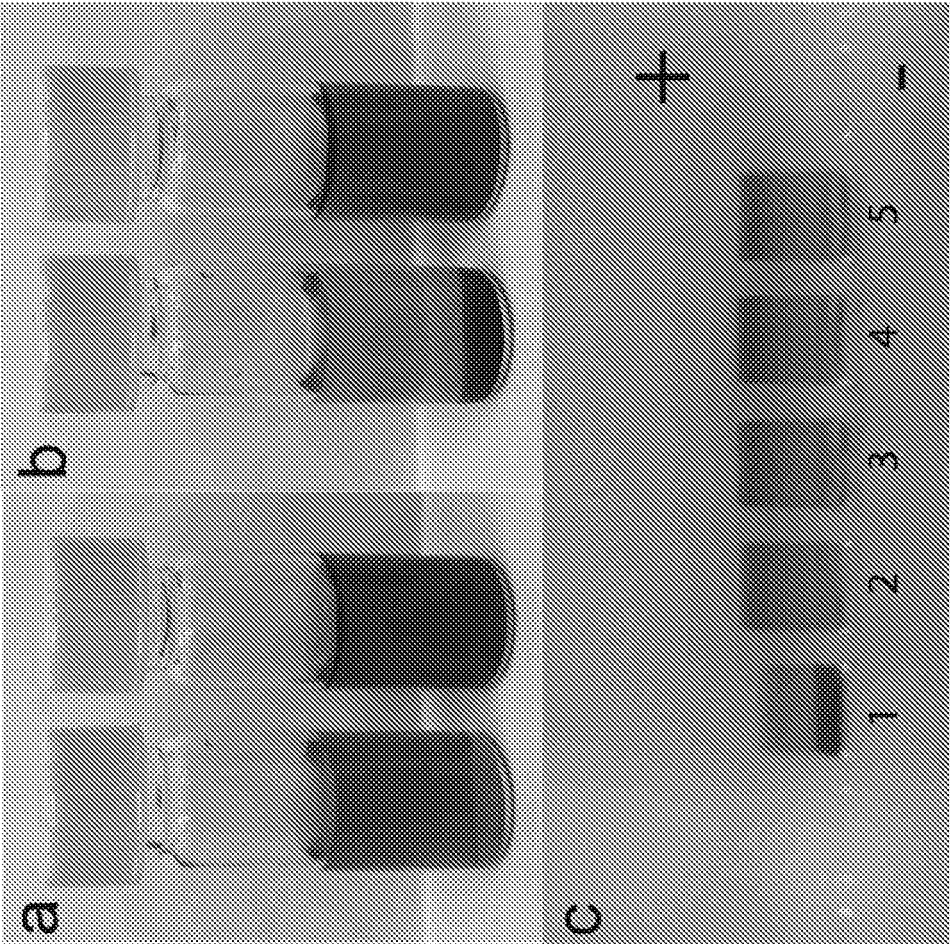
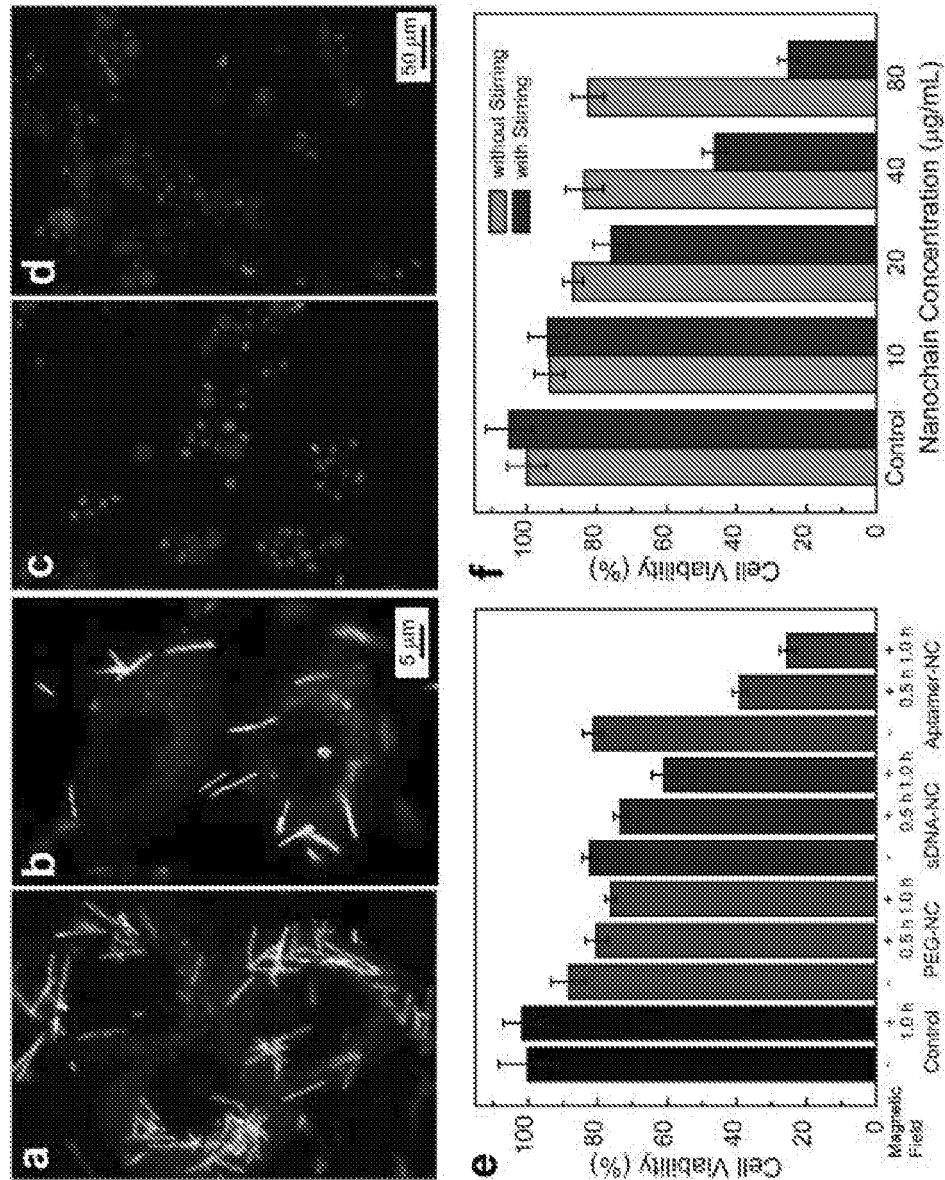


FIG. 12

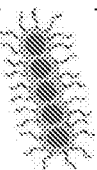


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FIG. 13

Scheme	Description	Components	Functions	Potential Applications
	Magnetic nanoparticles	Fe_2O_3 , Fe_3O_4 , etc. FeM ($\text{M} = \text{Au}, \text{Pt}, \text{Pd}, \text{Co}, \text{etc.}$), MFe_2O_4 ($\text{M} = \text{Co}, \text{Mn}, \text{etc.}$), $\text{Co}, \text{Ni}, \text{CoPt}, \text{CoD}, \text{NiO}, \text{etc.}$ Heterogeneous structures: $\{\text{Au}-\text{Fe}_2\text{O}_3, \text{Ag}-\text{Fe}_3\text{O}_4, \text{etc.}\}$ Assemblies (Fe_3O_4 beads, $\text{QD}-\text{Fe}_2\text{O}_3$ vesicles, etc.)	1) Fundamental building blocks of nanochains 2) As a drive part to response to the external magnetic field	Nanomotor Nano stir bar
	Molecules of dopamine family that can be used to fix the chains	Catecholamine-based compounds: dopamine, norepinephrine, L-3,4-dihydroxyphenylalanine, etc. Others: tannin, acid, 5,6-dihydroxy-1H-benzimidazole, etc.	1) Fix and stabilize the nanochains 2) Incorporate other monomers or templates 3) As a platform for further functionalization	Molecular imprinting coating Heavy metal ions absorbents

FIG. 13 (Cont.)

Scheme	Description	Components	Functions	Potential Applications
	Nanocatalysts that can be loaded by localized reduction, seeded growth or adsorption	Metal nanoparticles {Au, Ag, Pt, Pd, etc.} Metal oxides {TiO ₂ , ZnO, Hydroxyapatite, etc.}	1) Provide extra functions, such as catalysis, sensing, electrocatalytic activity.	Self-mixing catalyst
	Molecules that can be introduced by polydopamine enabled conjugation chemistry	Thiol/amino-terminated small molecules. Thiol/amino-terminated polymers Thiol/amino-terminated biomolecules {proteins, DNA, etc.} Other thiol/amino-terminated compounds.	1) Provide extra functions, such as targeting, separation, mechanotransduction.	Magnetolysis Cell manipulation Cell or bacteria separation Molecular separation Biosensing
	Additional structures that can grow on polydopamine or can be converted into from polydopamine	Metal organic framework {ZIF-8, UiO-66, etc.} Carbon {PDA can convert into carbon}	1) Provide extra novel functions.	Molecular sieve {storage or separation} Organic pollutant absorbents

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FIG. 14

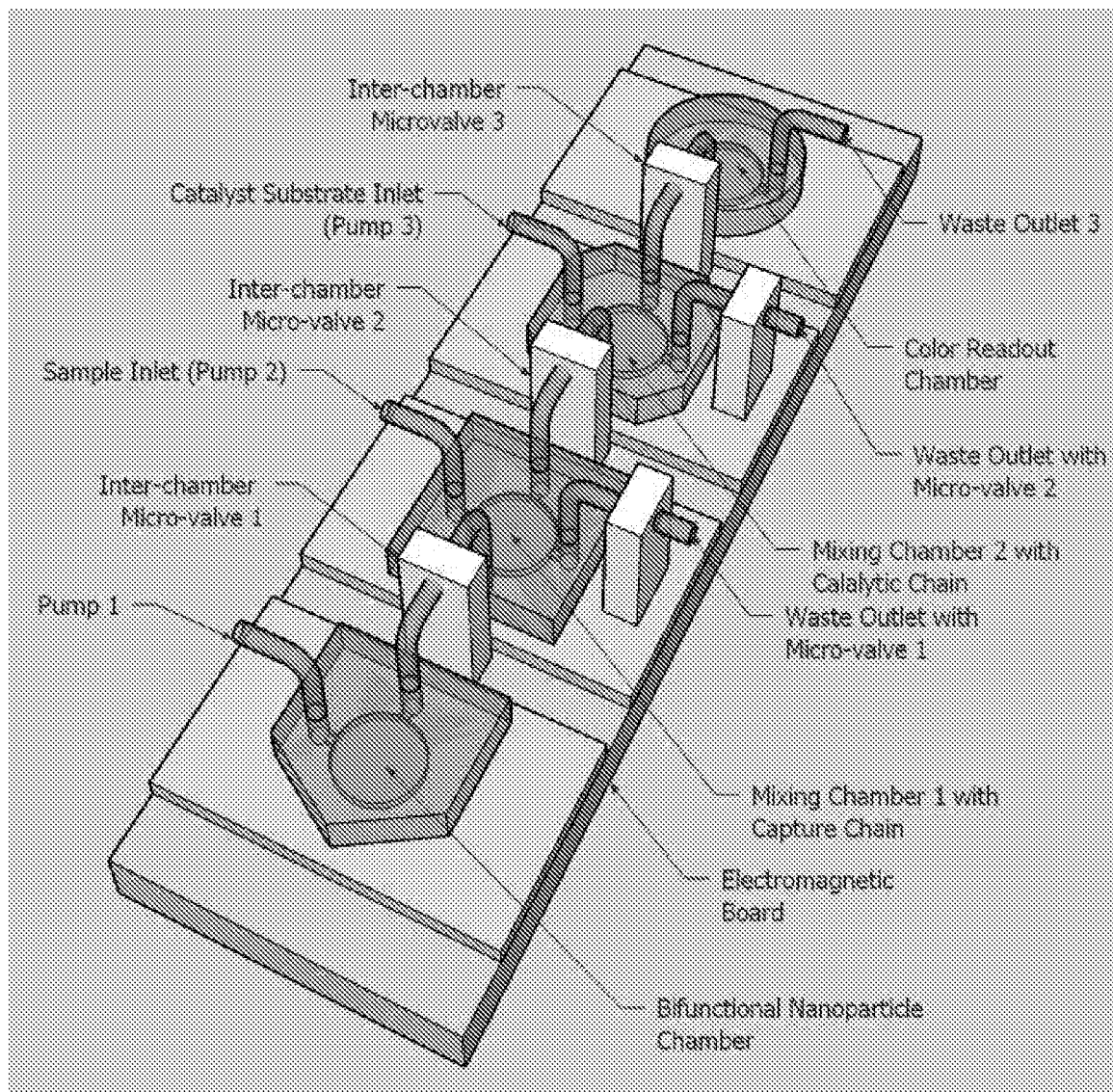


FIG. 15

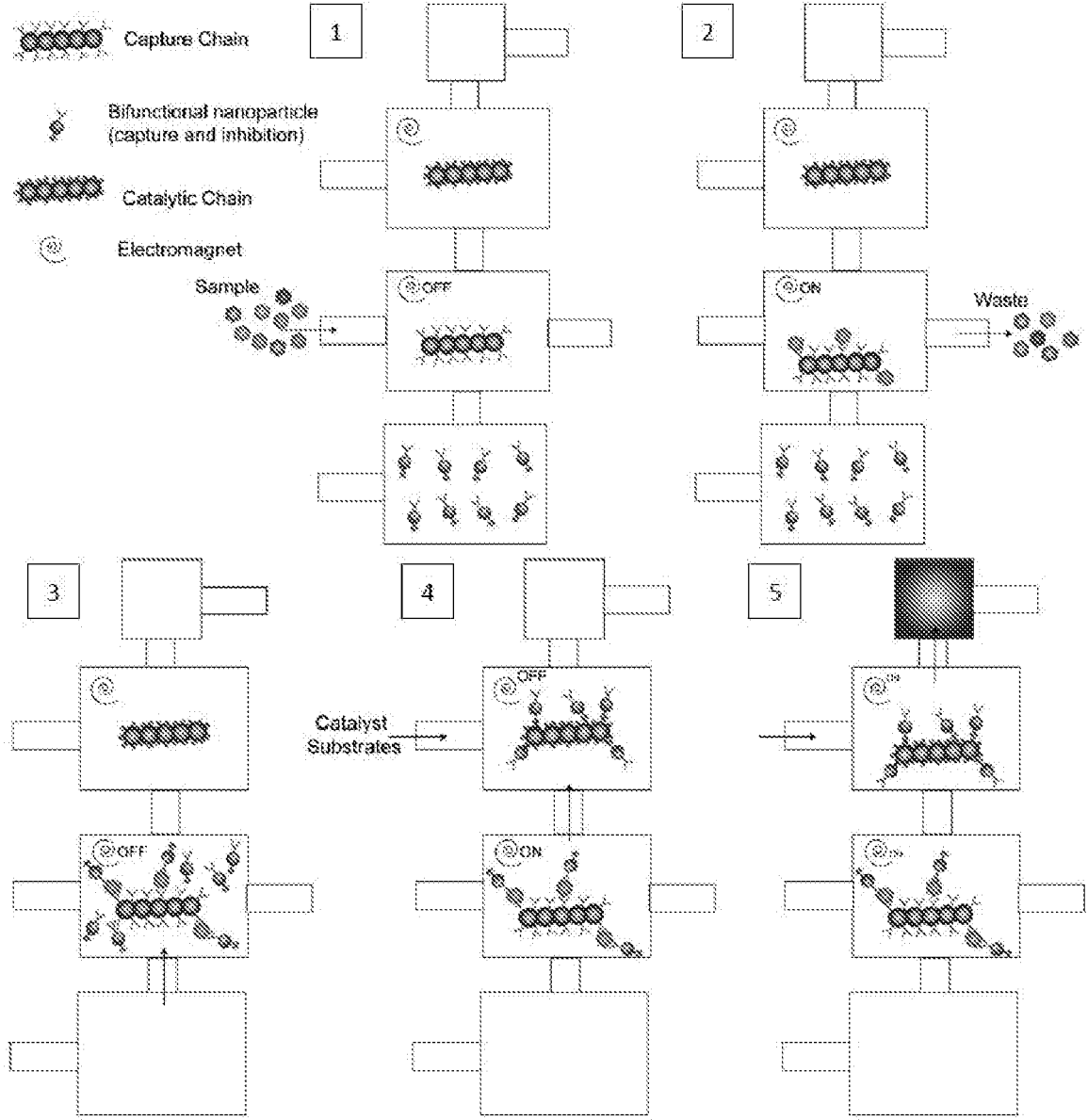
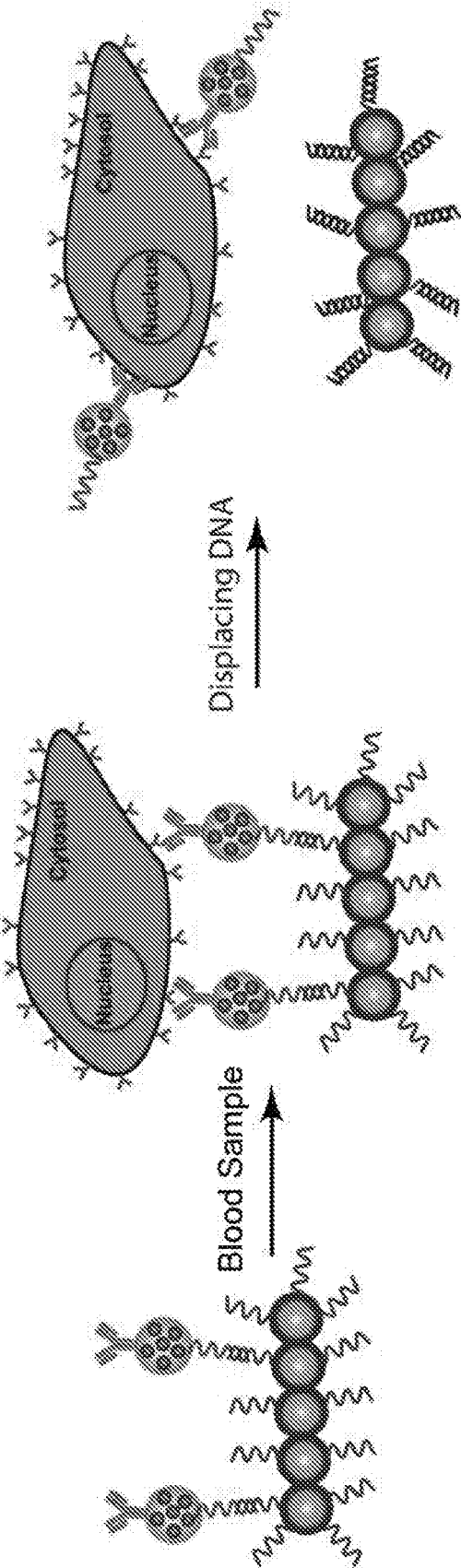


FIG. 16



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FIG. 17

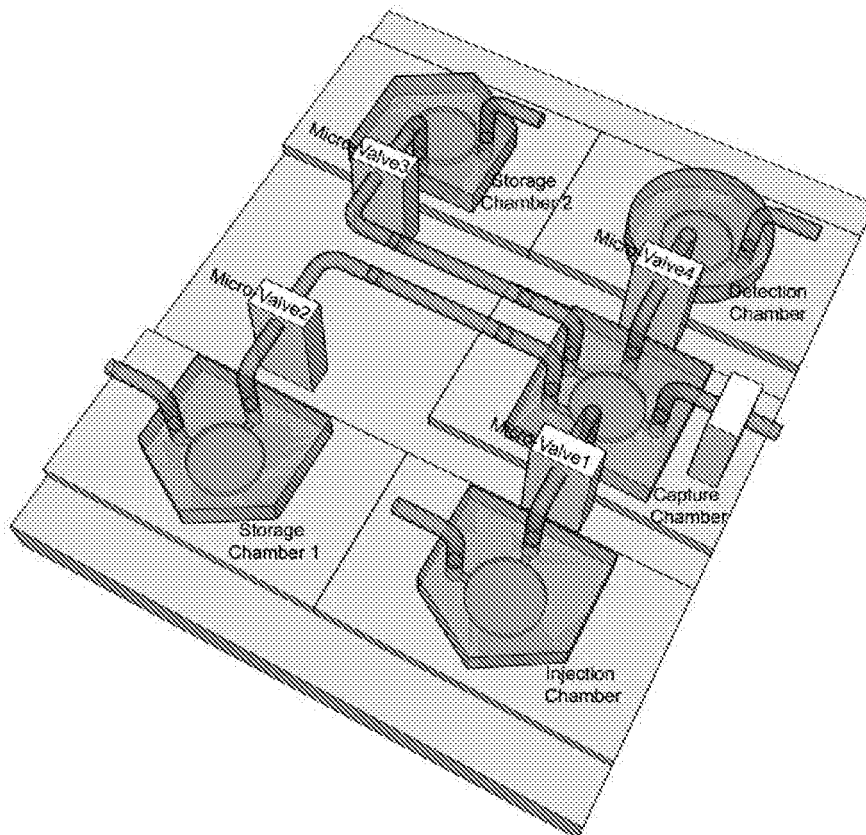
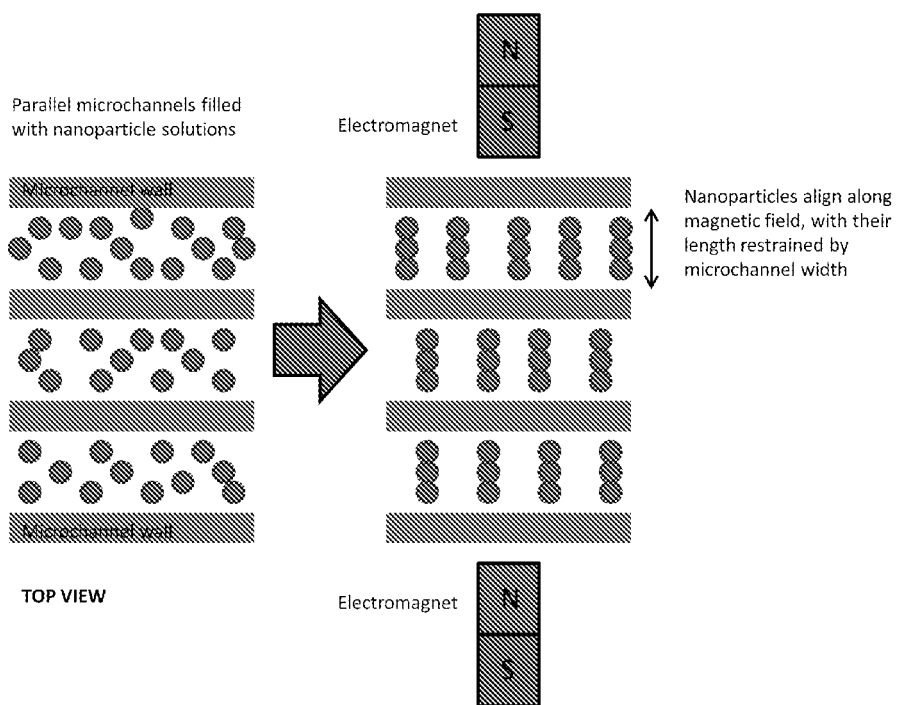


FIG. 18



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FIG. 19

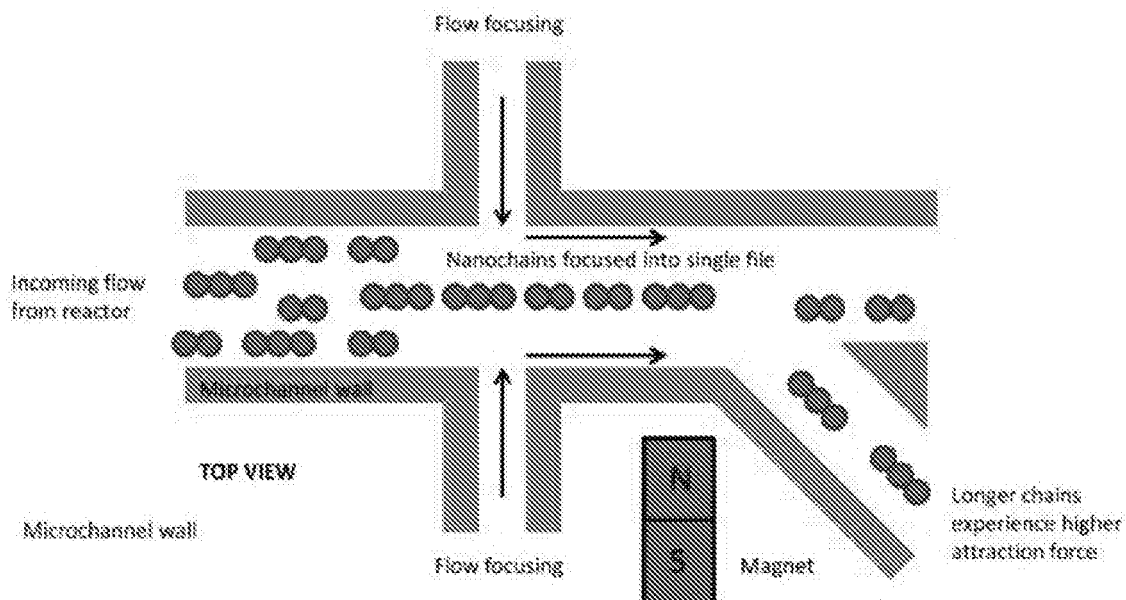
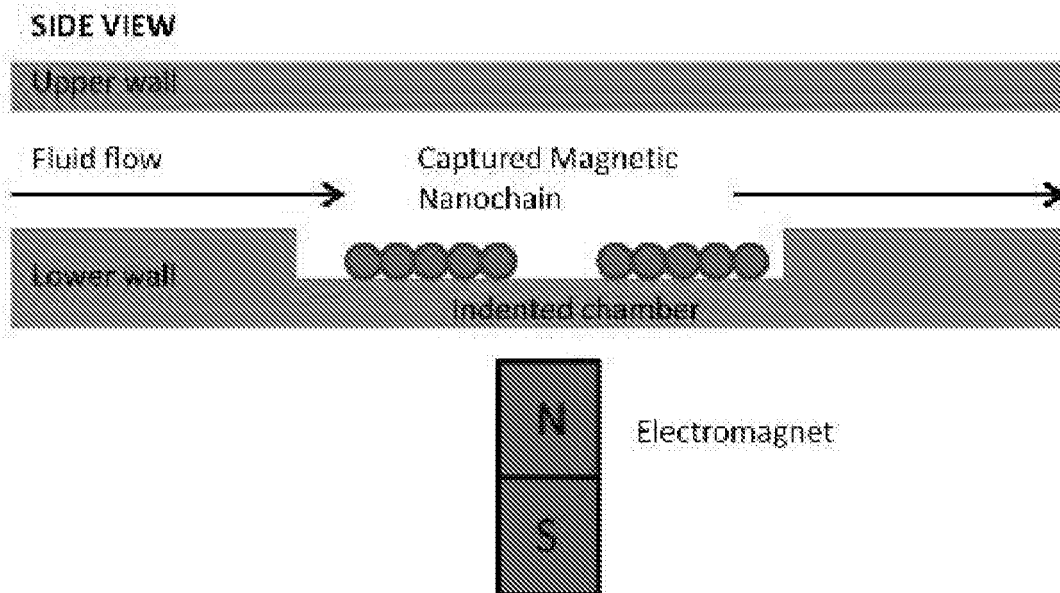


FIG. 20



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FIG. 21

