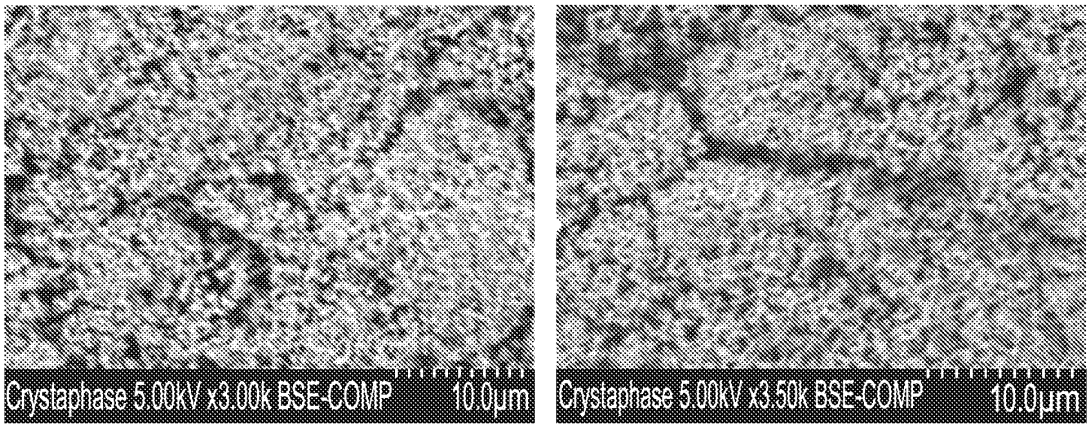
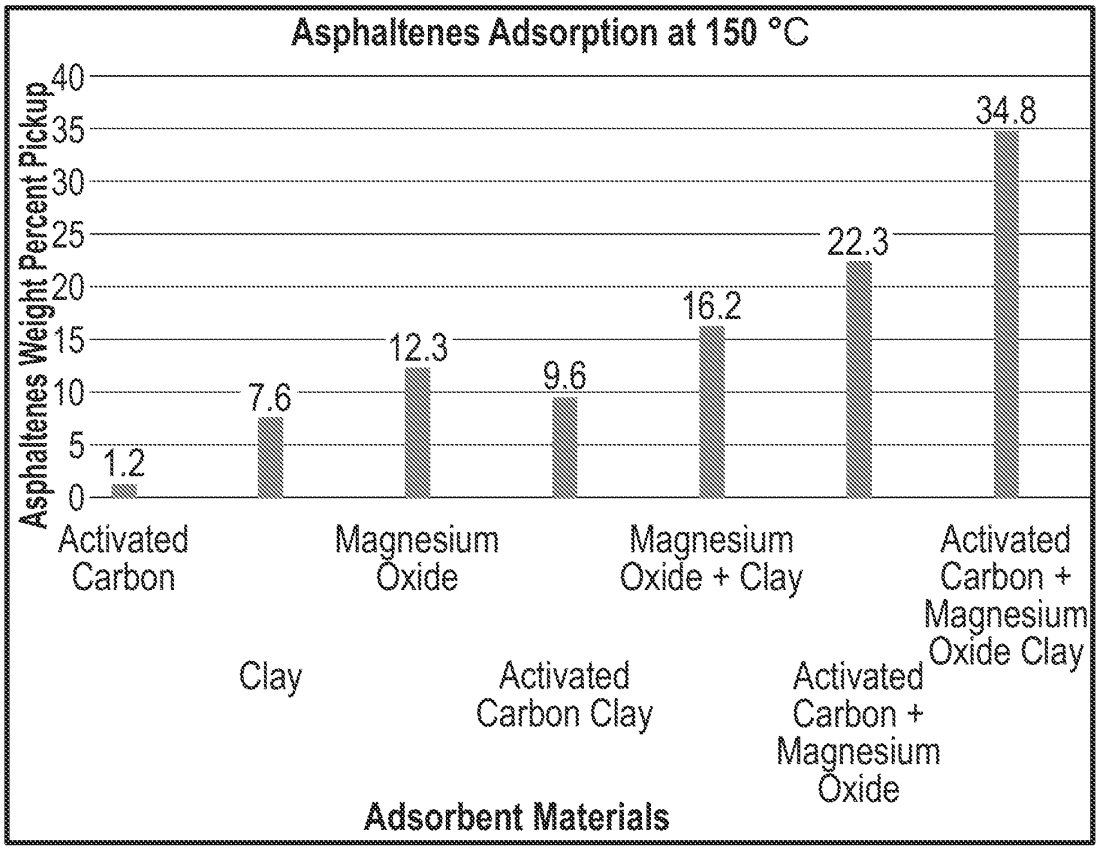


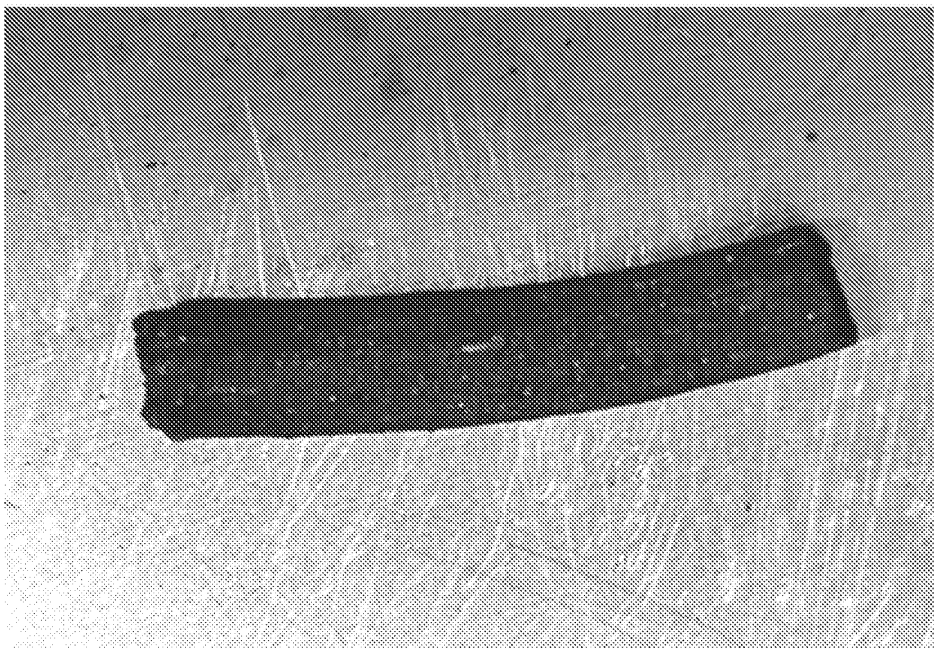
SEM Images of Asphaltene extracted from Vacuum Gas Oil Feedstock

FIG. 1



Asphaltenes adsorption at 150 °C for various materials by weight percent pickup

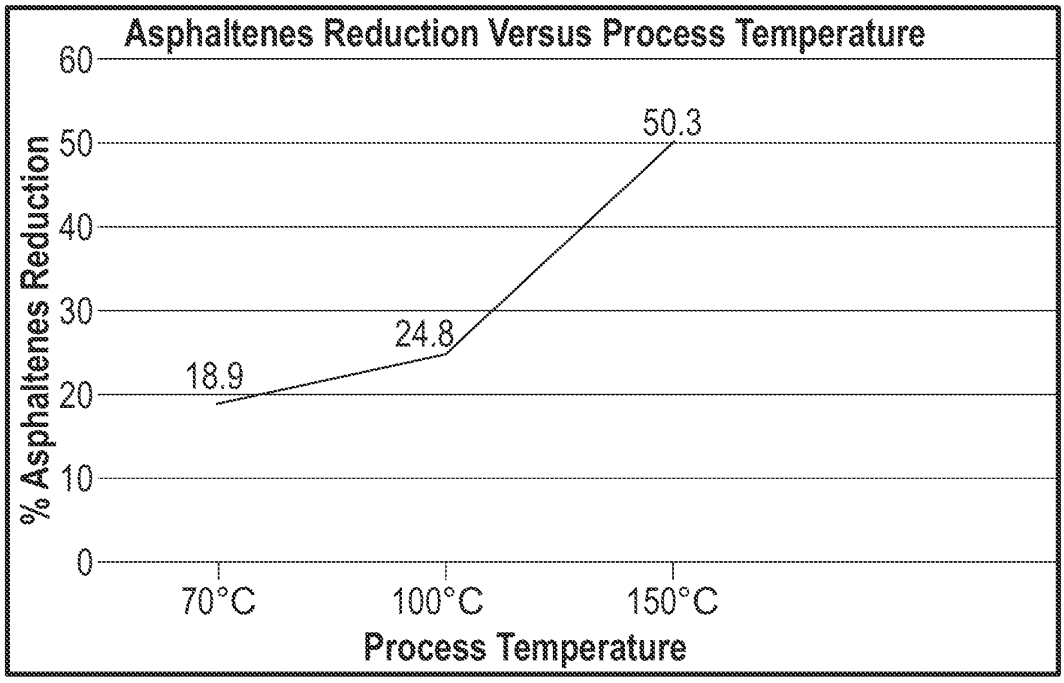
FIG. 2



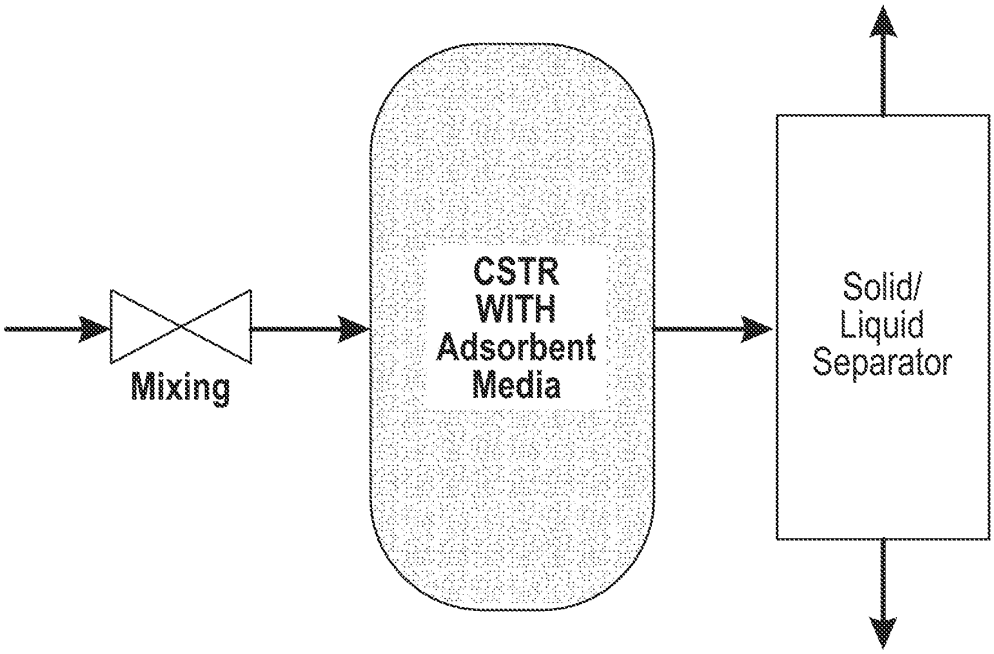
Example of asphaltene adsorbent in 1/8" extrudate shape

FIG. 3

FIG. 4

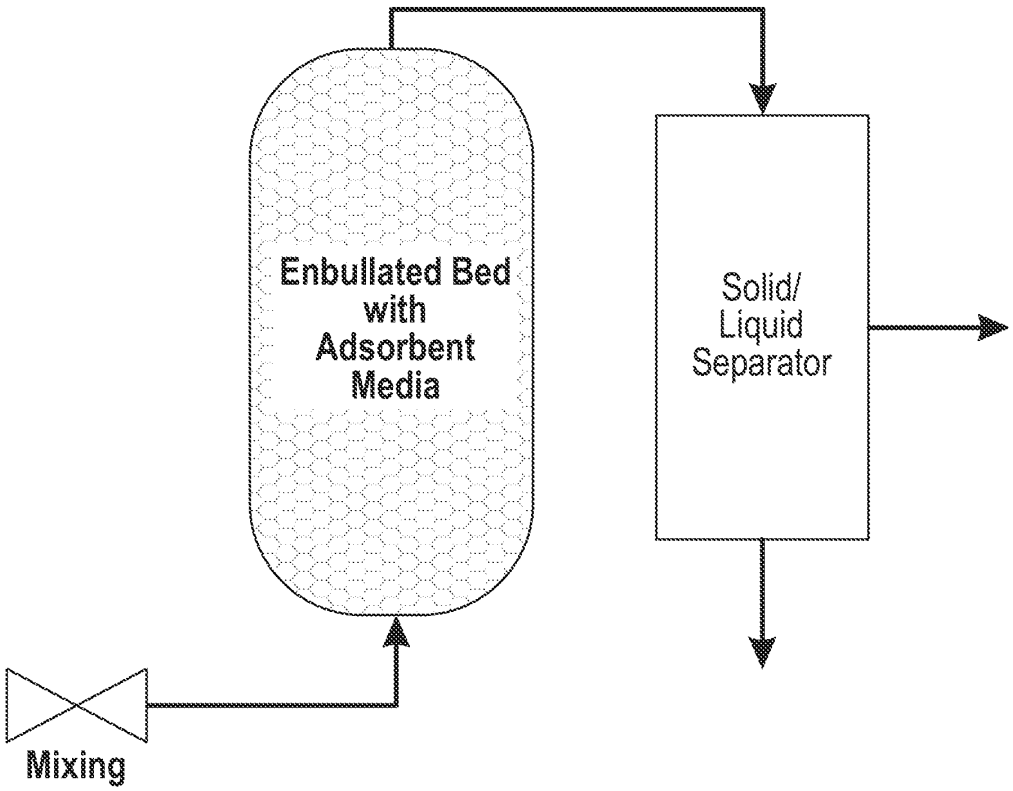


Reduction in asphaltenes vs. process temperature using a multi-component asphaltene adsorbent



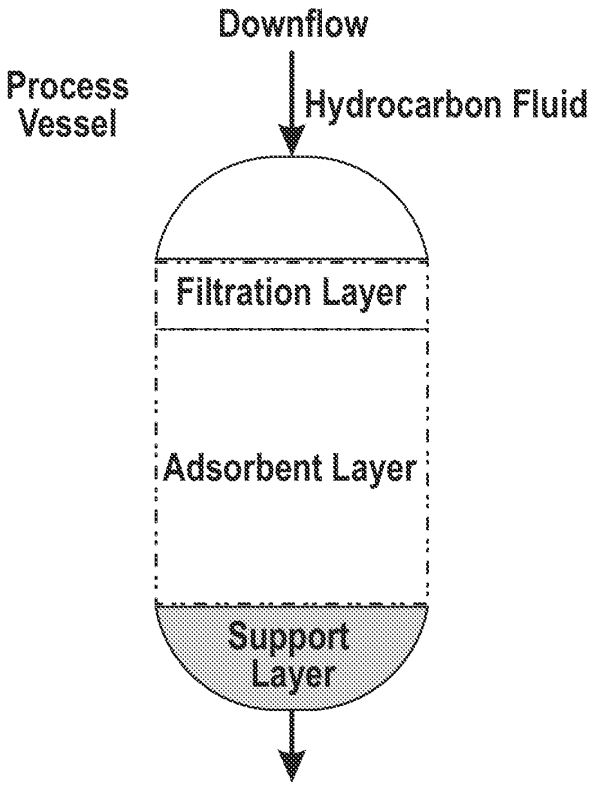
Example of CSTR

FIG. 5



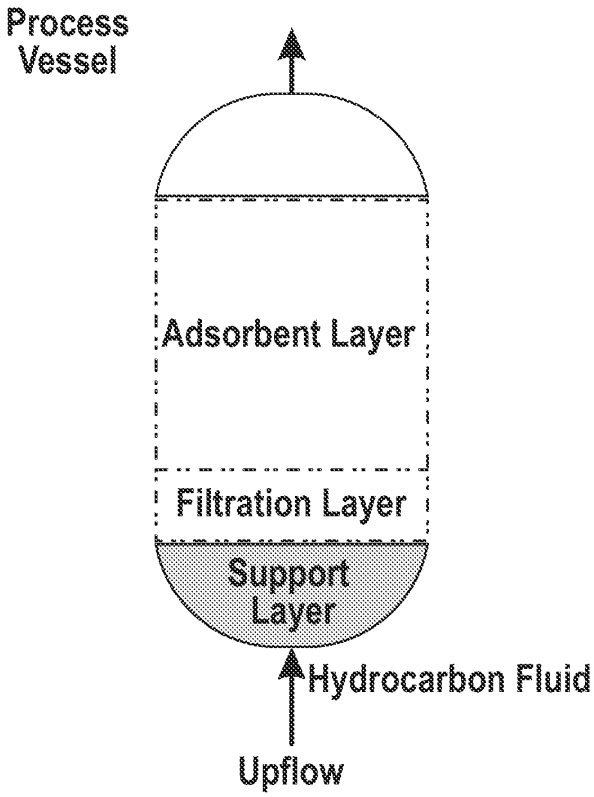
Example of Embullated Bed Reactor

FIG. 6



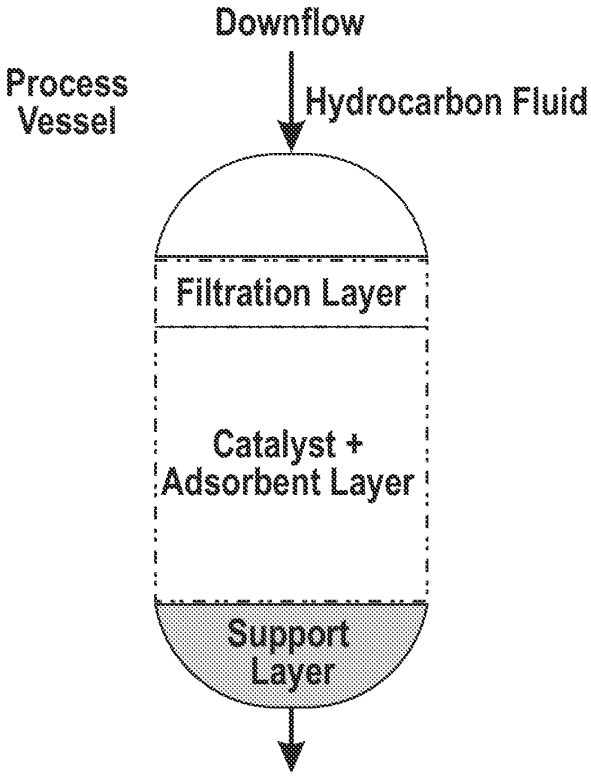
Example of Downflow Fixed Bed Reactor (Filtration + Adsorbent)

FIG. 7



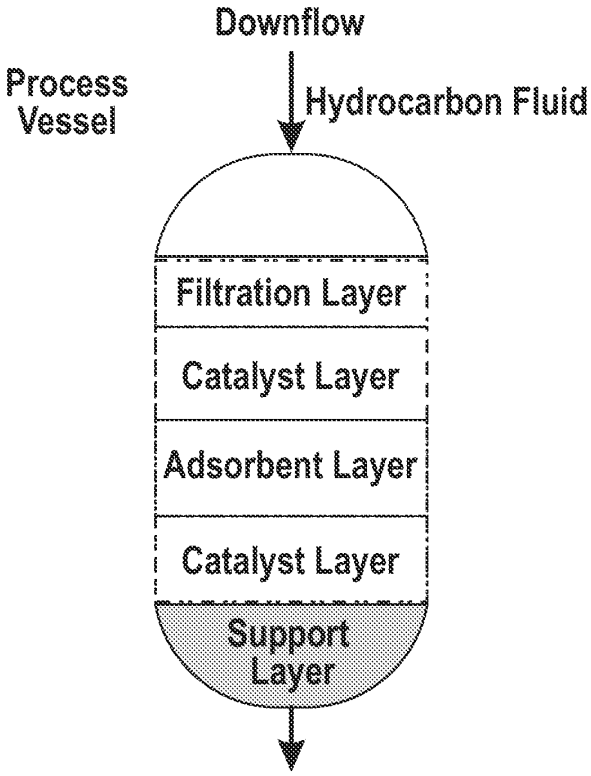
Example of Upflow Fixed Bed Reactor (Adsorbent + Filtration)

FIG. 8



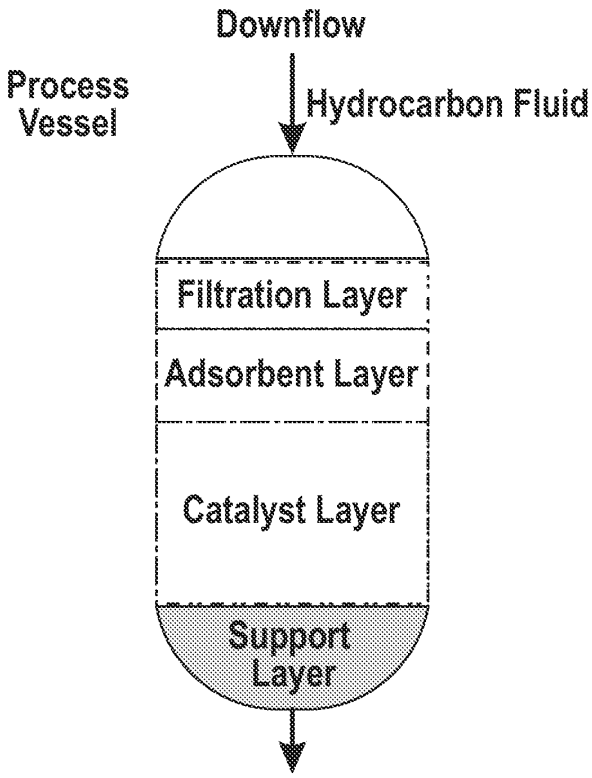
Example of Fixed Bed Reactor (Filtration + Catalyst/Adsorbent)

FIG. 9



Example of Fixed Bed Reactor (Filtration + Catalyst + Adsorbent + Catalyst)

FIG. 10



Example of Fixed Bed Reactor (Down flow reactor)

FIG. 11