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(54) Title: CERAMIC MEMBRANE TECHNOLOGY FOR MOLECULE-RANGE SEPARATION

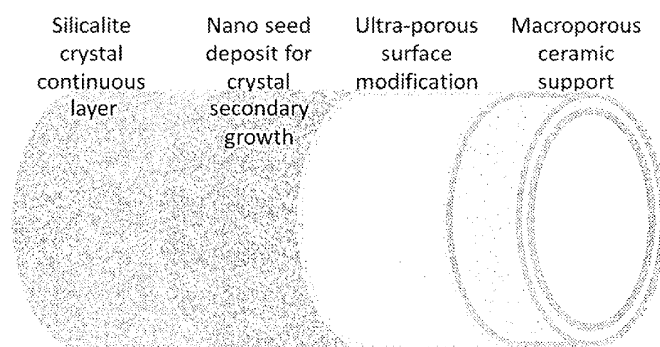


FIG. 2

(57) Abstract: Herein disclosed is a method of producing a silicalite membrane, which includes heating an aqueous solution that includes a dopant precursor and structure-directing template agents to form silicalite seeds incorporated with a dopant, depositing a buffer layer on a ceramic substrate prior to depositing the silicalite seeds on the buffer layer, contacting the ceramic substrate with a solution including the silicalite seeds to form a silicalite layer from the silicalite seeds on the ceramic substrate, and removing the structure-directing template agents to form the silicalite membrane, wherein the silicalite layer includes silicalite crystals incorporated with a dopant and each of the silicalite crystals has a hollow structure which forms the pores of the silicalite layer. The silicalite membrane includes a ceramic substrate having a buffer layer formed thereon, and a silicalite layer formed on the buffer layer, wherein the silicalite layer includes silicalite crystals incorporated with a dopant and each of the silicalite crystals has a hollow structure which forms the pores of the silicalite layer. In specific embodiments, the dopant comprises cerium, boron, tin, cobalt, aluminum, gallium, indium, yttrium, or a mixture thereof; the structure-directing template agents comprise tetrapropylammonium hydroxide and tetraethyl orthosilicate; the buffer layer is prepared from an acidic solution comprising tetraethyl orthosilicate and an alcohol, mixed with a surfactant comprising hexadecyltrimethylammonium bromide.

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