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(54) Title: CERAMIC ANION EXCHANGE MATERIALS

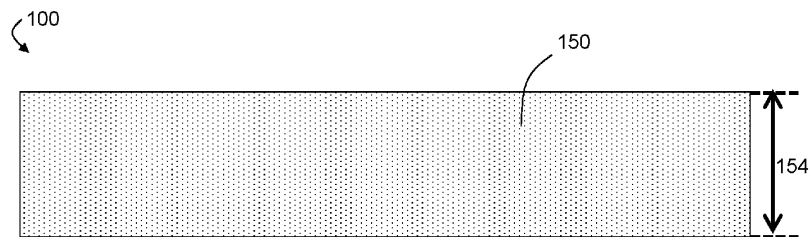


FIG. 1A

(57) Abstract: Anion exchange membranes and materials including silica-based ceramics, and associated methods, are provided. In some aspects, anion exchange membranes that include a silica-based ceramic that forms a coating on and/or within a porous support membrane are described. The anion exchange membranes and materials may have certain structural or chemical attributes (e.g., pore size/distribution, chemical functionalization) that, alone or in combination, can result in advantageous performance characteristics in any of a variety of applications for which selective transport of positively charged ions through membranes/materials is desired. In some embodiments, the silica-based ceramic contains relatively small pores (e.g., substantially spherical nanopores) that may contribute to some such advantageous properties. In some embodiments, the anion exchange membrane or material includes quaternary ammonium groups covalently bound to the silica-based ceramic.

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