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(54) **SINGLE STEP POLYMERIZATION OF COVALENTLY BOUND MULTILAYER MATRICES**

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USPC ..... 264/308, 496

See application file for complete search history.

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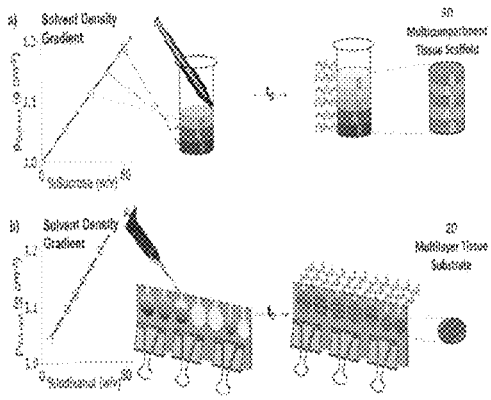
(57) **ABSTRACT**

A method is provided for forming complex tissue using density gradient multilayer polymerization (DGMP) to form strong hydrogels with smooth transitions between layers. The multicompartment hydrogel is formed by co-dissolving a polymer precurser with a constituent in multiple solvent fractions to a create prepolymer solutions with different densities, layering the prepolymer solutions on top of each other from high to low solvent density, and irradiating the prepolymer solutions to form a polymer. The hydrogels may be used as biomimetic matrices.

**20 Claims, 20 Drawing Sheets**