Claims

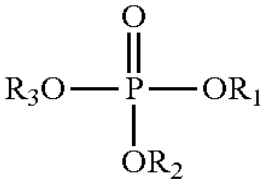
1. A method of forming a polishing pad, comprising:

depositing a plurality of composite layers with a 3D printer to reach a target thickness, wherein depositing the plurality of composite layers comprises:

dispensing one or more droplets of a curable resin precursor composition onto a support, wherein the curable resin precursor composition comprises:

one or more acrylate components; and

an anionic monomer having structure:



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wherein at least one of R_1, R_2, and R_3 is an alkyl ester radical, and the anionic monomer is present in an amount ranging between 2 wt. % to about 10 wt. % based on a total weight of the curable resin precursor composition; and

curing the curable resin precursor composition.

2. The method of claim 1, further comprising:

dispensing one or more droplets of a porosity-forming composition onto the support, wherein at least one component of the porosity-forming composition is removable to form ~~the~~ pores in the polishing pad.

3. The method of claim 1, wherein at least one of R_1, R_2, and R_3 is $CH_2CH_2OC(O)C(CH_2)CH_3$.

4. The method of claim 3, wherein R_1 and R_2 are H and R_3 is $CH_2CH_2OC(O)C(CH_2)CH_3$.

5. The method of claim 1, wherein at least two of R_1, R_2, and R_3 is $CH_2CH_2OC(O)C(CH_2)CH_3$.

6. The method of claim 5, wherein R_2 is H and R_1 and R_3 are $CH_2CH_2OC(O)C(CH_2)CH_3$.

7. The method of claim 1, wherein R_1, R_2, and R_3 are $CH_2CH_2OC(O)C(CH_2)CH_3$.

8. The method of claim 2, wherein the porosity-forming composition comprises a porosity-forming agent selected from glycols, glycol-ethers, amines, and combinations thereof.

9. The method of claim 2, wherein the porosity-forming composition comprises a porosity-forming agent selected from ethylene glycol, butanediol, dimer diol, propylene glycol-(1,2), propylene glycol-(1,3), octane-1,8-diol, neopentyl glycol, cyclohexane dimethanol (1,4-bis-hydroxymethylcyclohexane), 2-methyl-1,3-propane diol, glycerin, trimethylolpropane, hexanediol-(1,6), hexanetriol-(1,2,6) butane triol-(1,2,4), trimethylolethane, pentaerythritol, quinitol, mannitol, sorbitol, methylglycoside, diethylene glycol, triethylene glycol, tetraethylene glycol, polyethylene glycol, dibutylene glycol, polybutylene glycol, ethylene glycol, ethylene glycol monobutyl ether (EGMBE), diethylene glycol monoethyl ether, ethanolamine, diethanolamine (DEA), triethanolamine (TEA) and combinations thereof.

10. The method of claim 2, further comprising partially curing the dispensed one or more droplets of the curable resin precursor composition and the dispensed one or more droplets of the porosity-forming composition prior to exposing the dispensed one or more droplets of the curable resin precursor composition and the dispensed one or more droplets of the porosity-forming composition to at least one of an annealing processing, a rinsing process, or both.

11. A method of forming a polishing pad, comprising:

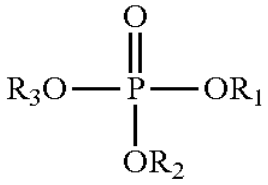
depositing a plurality of composite layers with a 3D printer to reach a target thickness, wherein depositing the plurality of composite layers comprises:

dispensing one or more droplets of a curable resin precursor composition onto a support, wherein the curable resin precursor composition comprises:

a first resin precursor component that comprises a multifunctional acrylate oligomer;

a second resin precursor component that comprise a multifunctional acrylate monomer; and

an anionic monomer having the structure:



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wherein at least one of R_1, R_2, and R_3 is an alkyl ester radical, and the anionic monomer is present in an amount ranging between 2 wt. % to about 10 wt. % based on a total weight of the curable resin precursor composition;

exposing the one or more droplets of the curable resin precursor composition to electromagnetic radiation to at least partially cure the curable resin precursor composition; and

repeating the dispensing and exposing to build a 3D-relief on the support; and

solidifying the plurality of composite layers to form a pad body, wherein solidifying the plurality of composite layers comprises curing the curable resin precursor composition.

12. The method of claim 11, wherein at least one of R_1, R_2, and R_3 is $CH_2CH_2OC(O)C(CH_2)CH_3$.

13. The method of claim 12, wherein R_1 and R_2 are H and R_3 is $CH_2CH_2OC(O)C(CH_2)CH_3$.

14. The method of claim 11, wherein at least two of R_1, R_2, and R_3 is $CH_2CH_2OC(O)C(CH_2)CH_3$.

15. The method of claim 14, wherein R_2 is H and R_1 and R_3 are $CH_2CH_2OC(O)C(CH_2)CH_3$.