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(54) Title: CATALYSTS FOR THE MECHANOCATALYTIC OXIDATIVE DEPOLYMERIZATION OF POLYMER-CONTAINING MATERIALS AND METHODS OF MAKING OXIDIZED REACTION PRODUCTS USING SAME

(57) Abstract: The presently disclosed and/or claimed inventive concept(s) relates generally to oxidative oxidized reaction products made from the mechanocatalytic oxidative depolymerization of lignin. More particularly, but without limitation, the mechanocatalytic oxidative depolymerization of lignin is performed in a non-aqueous/non-solvent based and solvent-free process, i.e., via a solid-solid mechanocatalytic oxidative reaction methodology. In one particular embodiment, the process of making such oxidative oxidized reaction products includes, without limitation, the step of mechanocatalytically reacting an oxidation catalyst with lignin or a lignin-containing material. The oxidative reaction products obtained from the process include, for example, at least one of vanillin, and syringaldehyde, vanillic acid, and syringic acid.

