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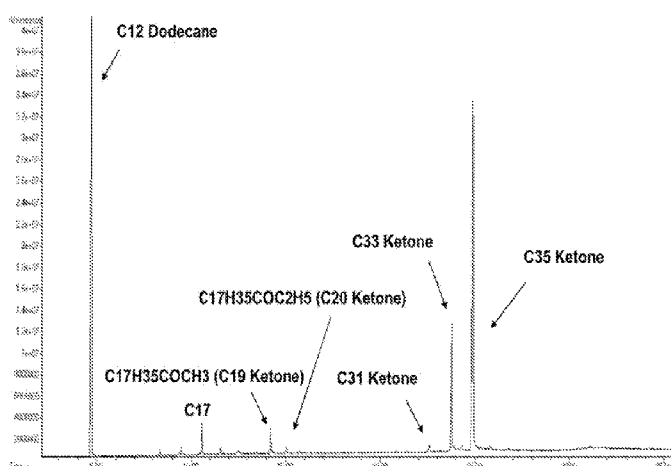


FIG. 3

(57) **Abstract:** Systems and methods are provided for processing a feed derived from a biomass source that contains nitrogen in the form of fatty amides, *e.g.*, derived from hydrothermal processing of a biomass source feed, while reducing/minimizing the amount of heteroatom removal performed during subsequent/concurrent hydroprocessing. Optionally, the feed can also contain free fatty acids. This is accomplished in part by first exposing the feed to a catalyst comprising a rare earth oxide, alkali oxide, and/or alkaline earth oxide, which can remove the nitrogen heteroatoms from the compounds within the feed or can convert the nitrogen to a form readily removed in subsequent hydroprocessing. The catalyst may also be suitable for catalyzing coupling (such as condensation) or conversion reactions of amides, carboxylic acids, carboxylic acid derivatives, and/or other molecules in the feed suitable for participating in the coupling reaction.