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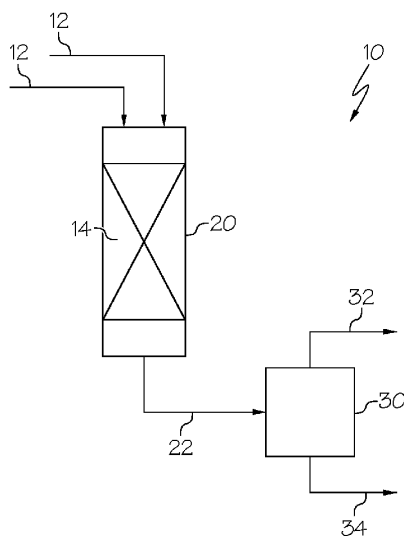


FIG. 1

(57) Abstract: A system for upgrading pyrolysis oil may include a pyrolysis upgrading unit having a mixed metal oxide catalyst and a separation unit operable to separate used mixed metal oxide catalyst from a reaction effluent. A method for upgrading pyrolysis oil may include contacting the pyrolysis oil with hydrogen in the presence of the mixed metal oxide catalyst at reaction conditions to produce a reaction effluent. The pyrolysis oil may include multi-ring aromatic compounds. The mixed metal oxide catalyst may include a plurality of catalyst particles and each of the plurality of catalyst particles having a plurality of metal oxides. Contacting the pyrolysis oil with hydrogen in the presence of the mixed metal oxide catalyst at the reaction conditions may convert at least a portion of the multi-ring aromatic compounds in the pyrolysis oil to the light aromatic compounds.

[Continued on next page]

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