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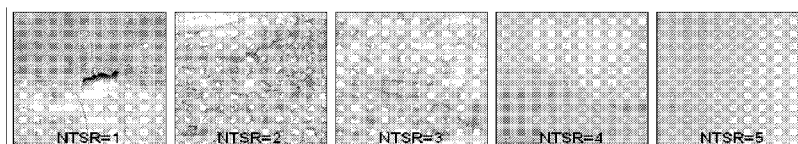
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(54) Title: POROUS PYROLYSIS REACTOR MATERIALS AND METHODS

**FIGURE 1**(57) Abstract: In one aspect, the invention includes a reactor apparatus for pyrolyzing a hydrocarbon feedstock, said apparatus including: a reactor component comprising a refractory material in oxide form, the refractory material having a melting point of no less than 20600C and which remains in oxide form when exposed to a gas having carbon partial pressure of 10^{-22} bar and oxygen partial pressure of 10^{-10} bar, at a temperature of 12000C; wherein said refractory material has no less than 4 vol% formed porosity, measured at 200C, based upon the bulk volume of said refractory material. In another embodiment, the refractory material has total porosity in the range of from 4 to 60 vol%.