

ABSTRACT

PRODUCTION OF UPGRADED PETROLEUM BY SUPERCRITICAL WATER

A method for upgrading a petroleum feedstock using a supercritical water petroleum upgrading system includes introducing the petroleum feedstock, water and an auxiliary feedstock. The method includes operating the system to combine the petroleum feedstock and the water to form a mixed petroleum feedstock and introducing separately and simultaneously into a lower portion of an upflowing supercritical water reactor. The auxiliary feedstock is introduced such that a portion of a fluid contained within the upflowing reactor located proximate to the bottom does not lack fluid momentum. An embodiment of the method includes operating the supercritical water petroleum upgrading system such that the upflowing reactor product fluid is introduced into an upper portion of a downflowing supercritical water reactor. The supercritical water petroleum upgrading system includes the upflowing supercritical water reactor and optionally a downflowing supercritical water reactor.

FIG. 1