

A process for the hydrogenation of a hydrocarbon feed includes contacting a major amount of the hydrocarbon feed with hydrogen in a counter-current manner in a first reaction zone under hydrogenation reaction conditions in the presence of a hydrogenation catalyst in at least a first catalyst bed wherein a liquid effluent exits at a bottom end of the first reaction zone and a hydrogen-containing gaseous effluent exits at a top end of the first reaction zone, and contacting a minor portion of the hydrocarbon feed with said hydrogen-containing gaseous effluent in a co-current manner in a second reaction zone having a catalyst bed positioned to receive the hydrogen-containing effluent of the first reaction zone.