

Abstract

Method and System for Directly Cracking Crude Oil to Prepare Olefin

The present invention relates to a method and system for cracking crude oil. The method comprises: delivering the crude oil to a first tube group of a convection section of a cracking furnace for preheating and then performing vaporization to obtain a first gas phase and a first liquid phase; performing high-pressure extraction on the first liquid phase to obtain a non-asphalt oil and an asphalt; and mixing the first gas phase and the non-asphalt oil with water vapor respectively, or mixing the first gas phase with the non-asphalt oil prior to mixing with water vapor, then delivering the same to a second tube group of the convection section of the cracking furnace for heating, followed by delivering same to a radiation section of the cracking furnace for cracking to obtain a cracked product, and separating the cracked product to obtain low-carbon olefins. In the present invention, after the crude oil is preheated in a cracking furnace and vaporized, the obtained gas phase is passed into the cracking furnace, and the obtained liquid phase is passed through a supercritical extraction unit to separate an extract oil, which is then passed into the cracking furnace. The method can effectively improve cracking efficiency of the crude oil, improve the yield of low-carbon olefins in the product, extend the operating cycle, and reduce coking of a gasified crude oil mixture in a cracking process.

[Figure 1]