

Abstract

A method for producing an aromatic hydrocarbon with an oxygenate as raw material

The present invention relates to a method for producing an aromatic hydrocarbon with an oxygenate as raw material, comprising i) reacting an oxygenate in at least one aromatization reactor to obtain an aromatization reaction product; ii) separating the aromatization reaction product through a separation unit A to obtain a gas phase hydrocarbons flow X and a liquid phase hydrocarbons flow Y; iii) after removing gas and/or a part of the oxygenate from the gas phase hydrocarbons flow X through a separation unit B, a hydrocarbons flow X1 containing a non-aromatic hydrocarbon is obtained; or after removing gas and/or a part of the oxygenate from the gas phase hydrocarbons flow X through a separation unit B, a reaction is conducted in another aromatization reactor and a separation is conducted through a separation unit A to obtain a flow X2 containing a non-aromatic hydrocarbon and a flow X3 containing an aromatic hydrocarbon; iv) after combining the liquid phase hydrocarbons flow Y and optionally the flow X3 containing an aromatic hydrocarbon, a mixed hydrocarbons flow M of an aromatic hydrocarbon having less than or equal to 7 carbon numbers and a flow N of the residual hydrocarbons is obtained by a non-precise rectification of a separation unit C; v) separating the flow N of the residual hydrocarbons through a separation unit D to obtain a flow K containing a non-aromatic hydrocarbon, a C₈ aromatic hydrocarbon flow J and a C₉⁺ aromatic hydrocarbon flow L; vi) returning one of the hydrocarbons flow X1 containing a non-aromatic hydrocarbon and the flow X2 containing a non-aromatic hydrocarbon, the mixed hydrocarbons flow M of an aromatic hydrocarbon having less than or equal to 7 carbon numbers and/or a part or all of the flow K containing a non-aromatic hydrocarbon, optionally with an additional C₂⁺ hydrocarbons flow, to the above oxygenate; or returning one of the hydrocarbons flow X1 containing a non-aromatic hydrocarbon and the

flow X2 containing a non-aromatic hydrocarbon, a mixed hydrocarbons flow M of an aromatic hydrocarbon having less than or equal to 7 carbon numbers and/or a part or all of the flow K containing a non-aromatic hydrocarbon to the aromatization reactor in iii); vii) optionally, reacting the C_9^+ aromatic hydrocarbons flow L in at least one reactor selected from a transalkylation reactor and a dealkylation reactor to obtain a C_8 aromatic hydrocarbon flow L1. The method of the present invention solves the above problems relatively greatly and can be used in industrial production of aromatic hydrocarbon with oxygenates as raw material(s).