

Abstract

**TITLE OF INVENTION: ETHYLENE PRODUCTION PROCESS THROUGH
CATALYTIC DEHYDRATION REACTION OF ETHANOL USING HZSM-5
5 CATALYST IMPREGNATED WITH TUNGSTEN-CONTAINING COMPOUNDS**

The present invention relates to a process for producing ethylene by dehydration of ethanol using a HZSM-5 catalyst modified with a tungsten-containing compound.

10 The process is carried out in the following steps:

a. loading a HZSM-5 catalyst impregnated with a tungsten compound into a fixed bed reactor and flushing the catalyst with nitrogen gas,

15 b. heating ethanol liquid at a temperature of 52 - 70°C and a pressure of 1-2 bar to produce ethanol vapor,

c. flowing the heated ethanol vapor using nitrogen as a carrier gas until it enters the fixed bed reactor that has been loaded with the HZSM-5 catalyst modified with the tungsten-containing compound, and

20 d. condensing the reaction products to separate ethylene gas from the condensable reaction products through gradual condensation with a temperature range of -5°C to -30°C.

The catalytic dehydration reaction of ethanol in the
25 reactor is at a temperature of between 220-300°C and a pressure of 1-2 bar. The HZSM-5 catalyst impregnated with a tungsten-containing compound is a HZSM-5 catalyst that was impregnated with phosphotungstic acid having a chemical formula of $H_3PW_{12}O_{40}$. The material of HZSM-5 catalyst in
30 the HZSM-5 catalyst impregnated with a tungsten-containing compound has a Si/Al ratio of 30-62, and more preferably 32-38.