

Abstract

The invention relates to a rare earth- and phosphorus-containing molecular sieve of MFI structure rich in mesopores and a process of producing same, wherein the molecular sieve has a ratio of $n(\text{SiO}_2)/n(\text{Al}_2\text{O}_3)$ of more than 15 and less than 70; the molecular sieve has a content of phosphorus of 1-15 wt%, calculated as P_2O_5 and based on the dry weight of the molecular sieve; the content of the supported metal in the molecular sieve is 1-10 wt% supported metal M1 and 0.1-5 wt% supported metal M2 based on the oxide of the supported metal and the dry weight of the molecular sieve, wherein the supported metal M1 is one or two selected from lanthanum and cerium, and the supported metal M2 is one selected from iron, cobalt, nickel, copper, manganese, zinc, tin, bismuth and gallium; the volume of mesopores in the molecular sieve represents 40-70% by volume of the total pore volume of the molecular sieve by volume. The molecular sieve of MFI structure can show excellent ethylene yield and simultaneously results in high outputs of propylene and BTX in the catalytic cracking of petroleum hydrocarbons. The invention also aims to provide a catalyst containing the rare earth- and phosphorus-containing molecular sieve of MFI structure rich in mesopores and a process of producing same.