

Abstract

Disclosed is a highly stable modified Y-type molecular sieve, its preparation and application thereof. The modified Y-type molecular sieve has a modifying metal content of about 0.5-6.3 wt% calculated on the basis of an oxide of the modifying metal and a sodium content of no more than about 0.5 wt% calculated on the basis of sodium oxide, on a dry basis and based on the weight of the modified Y-type molecular sieve, the modifying metal being magnesium and/or calcium, wherein the modified Y-type molecular sieve has a proportion of non-framework aluminum content to the total aluminum content of no more than about 20%, a total pore volume of about 0.33-0.39 ml/g, a proportion of the pore volume of secondary pores having a pore size of 2-100 nm to the total pore volume of about 10-25%, a lattice constant of about 2.440-2.455 nm, a lattice collapse temperature of not lower than about 1040 °C, and a ratio of B acid to L acid in the total acid content of no less than about 2.30, as determined by pyridine adsorption infrared spectroscopy at 200 °C. When used in catalytic cracking of heavy oils, the modified Y-type molecular sieve and a catalyst comprising the same show a low coke selectivity, and a high gasoline yield and liquefied gas yield, and the resulted gasoline has an increased content of branched hydrocarbons.