

Abstract

Disclosed are a modified Y-type molecular sieve, a catalytic cracking catalyst comprising the same, their preparation and application thereof, wherein the modified Y-type molecular sieve has a rare earth content of about 4% to about 11% by weight on the basis of the oxide, a phosphorus content of about 0.05% to about 10% by weight on the basis of P_2O_5 , a sodium content of no more than about 0.5% by weight on the basis of sodium oxide, and an active element content of about 0.1% to about 5% by weight on the basis of the oxide, with the active element being gallium and/or boron; and the modified Y-type molecular sieve has a total pore volume of about 0.36 mL/g to about 0.48 mL/g, a percentage of the pore volume of secondary pores having a pore size of 2-100 nm to the total pore volume of about 20% to about 40%; a lattice constant of about 2.440 nm to about 2.455 nm, a lattice collapse temperature of not lower than about 1060 °C; a percentage of non-framework aluminum content to the total aluminum content of no more than about 10%, and a ratio of B acid to L acid in the strong acid content of the modified Y-type molecular sieve of no less than about 3.5. When used in the processing of hydrogenated light cycle oils (LCOs), the modified Y-type molecular sieve and the catalytic cracking catalyst comprising the same show high LCO conversion efficiency, low coke selectivity, and a higher yield of gasoline rich in aromatics.