

Abstract

Disclosed are a rare earth modified Y-type molecular sieve rich in secondary pores, preparation thereof, and a catalyst comprising the same. The modified Y-type molecular sieve has a rare earth oxide content of about 4% to about 12% by weight, a phosphorus content of about 0% to about 10% by weight, a sodium oxide content of no more than about 1.0% by weight, a total pore volume of about 0.36 to 0.48 mL/g, a percentage of the pore volume of secondary pores 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 percentage of the non-framework aluminum content to the total aluminum content of no more than about 10%, a lattice collapse temperature of not lower than about 1060 °C, and a ratio of B acid to L acid of no less than about 3.50. The preparation of the molecular sieve comprises the steps of ion-exchange with rare earth, hydrothermal roasting, gas phase ultra-stabilization, acid treatment, and an optional phosphorus modification. When used in catalytic cracking of heavy oils, the modified Y-type molecular sieve shows a higher heavy oil conversion activity, a lower coke selectivity, and a higher gasoline yield, liquefied gas yield, light oil yield and total liquid yield.

Fig. 1