

Domanda 1

Si discutano le potenzialità dei metodi transienti sperimentali applicati all'analisi di meccanismi catalitici, esemplificando in relazione a processi catalitici ambientali

Domanda 2

Si discutano le modalità sperimentali per lo studio cinetico di una reazione catalitica esemplificando in relazione a processi catalitici ambientali

Domanda 3

Si definiscano le tecniche sperimentali ottimali per studiare la cinetica delle reazioni catalitiche esemplificando in relazione a processi catalitici ambientali

Domanda 1

Come eseguire una prova Temperature Programmed Desorption?

Cu-SSZ-13 and Cu-SAPO-34 zeolite catalysts were fully formulated washcoat cordierite monoliths purchased from the major catalyst suppliers and were hydrothermally aged at 600, 750, and 850 C in simulated exhaust gases containing water. Their catalytic activities were tested in selective catalytic reduction (SCR) of NO_x with ammonia. The microstructure of the zeolite supports, identity of copper species, acidity and reactant adsorption ability were investigated in detail using various characterization methods. The results showed that hydrothermal treatment of Cu-SSZ-13 and Cu-SAPO-34 catalysts had a significant influence on the physicochemical properties and reactant adsorption abilities of the catalysts, which resulted in different catalytic performances in NH₃-SCR. The hydrothermal treatment drastically decreased the surface area and pore volume of both the Cu-SSZ-13 and Cu-SAPO-34 catalysts. TEM results indicated that obvious aggregation of Cu-SSZ-13 and Cu-SAPO-34 occurred while some CuO particulates migrated from isolated Cu²⁺ species were formed during the aging test. Hydrothermal treatment of the Cu-SSZ-13 and Cu-SAPO-34 catalysts caused the migration of Cu²⁺, a decrease in acidity and dealumination. The change in the coordination environment of Cu²⁺ affected NO_x adsorption and activation on the catalyst surface. Both the copper sites and the acidity might be the main factor for the NH₃-SCR reaction on Cu-CHA catalyst.

Domanda 2

Come analizzare la composizione di una corrente gassosa?

Cu-SSZ-13 and Cu-SAPO-34 zeolite catalysts were fully formulated washcoat cordierite monoliths purchased from the major catalyst suppliers and were hydrothermally aged at 600, 750, and 850 C in simulated exhaust gases containing water. Their catalytic activities were tested in selective catalytic reduction (SCR) of NO_x with ammonia. The microstructure of the zeolite supports, identity of copper species, acidity and reactant adsorption ability were investigated in detail using various characterization methods. The results showed that hydrothermal treatment of Cu-SSZ-13 and Cu-SAPO-34 catalysts had a significant influence on the physicochemical properties and reactant adsorption abilities of the catalysts, which resulted in different catalytic performances in NH₃-SCR. The hydrothermal treatment drastically decreased the surface area and pore volume of both the Cu-SSZ-13 and Cu-SAPO-34 catalysts. TEM results indicated that obvious aggregation of Cu-SSZ-13 and Cu-SAPO-34 occurred while some CuO particulates migrated from isolated Cu²⁺ species were formed during the aging test. Hydrothermal treatment of the Cu-SSZ-13 and Cu-SAPO-34 catalysts caused the migration of Cu²⁺, a decrease in acidity and dealumination. The change in the coordination environment of Cu²⁺ affected NO_x adsorption and activation on the catalyst surface. Both the copper sites and the acidity might be the main factor for the NH₃-SCR reaction on Cu-CHA catalyst.