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Silica Coated Hollow α-Fe2O3 Derived from Fe-MIL-88A Metal Organic Framework (MOF) as an Efficient Catalyst for Enhanced Selective Catalytic Reduction (SCR) of NO with NH3

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Extended Abstract

Selective catalytic reduction (SCR) of nitrogen oxides (NOx) with NH_3 reducing agent is widely used to remove NOx that are emitted from stationary sources. However, the volatility, toxicity and easy deactivation of conventional V_2O_5 catalyst are limitations. Since the environmentally benign character, thermal stability and natural abundance, iron oxide have been explored for the SCR of NO with ammonia. However, these materials suffer from insufficient catalytic activity at low temperature and deactivation from H_2O and SO_2. [1][2] Hollow core-shell nenoareactors are the system which provide an isolated space with a unique chemical and physical environment. The thermal stability and catalytic activity have been enhanced by using these systems. [3]

In this work, rod shaped α-Fe_2O_3@SiO_2 core shell nanoreactors were prepared by the calcination from Fe-MIL-88A metal organic framework (MOF) for SCR of NO with NH_3 to enhance catalytic activity and to understand nanoreactor system. The morphology and structural properties of the catalysts were characterized using TEM, SEM, XRD, BET and EDS mapping analysis. Based on the results of HRTEM, the void of α-Fe_2O_3 was observed clearly. The SCR catalytic activity of NO with NH_3 was analyzed using the prepared α-Fe_2O_3@SiO_2 core-shell particles. It revealed higher NO conversion than the bulk iron oxide and thermal stability. In addition, the morphology of α-Fe_2O_3@SiO_2 particles have an effect on the surface area and catalytic performance.

References

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