

NO_x Reduction with Copper in Zeolites

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NO_x, in the form of NO or NO₂ is a common pollutant in flu gas from the burning of fossil and bio fuels. The negative effects of NO_x pollution are quite severe. Acid rain and degradation of the ozone layer are only some of the consequences of this air pollutant.

One of the methods used to diminish the pollution of NO_x is selective catalytic reduction, SCR. This phenomenon is the reduction of NO_x into nitrogen, through a reaction with ammonia. This reaction is facilitated by various catalysts the most common being vanadium on titanium. The problem with these catalysts is, they are quite expensive because they are based on rare metals, with a limited supply and usually carcinogenic.

This is not the case with zeolites. Zeolites are based on aluminumsilicates, which are among the most abundant materials in the upper layers of the earthcrust. These zeolites are doped with copper, which performs the catalytic reaction. Due to zeolites quite porous nature, a lot of the ammonia can be stored inside the zeolite pores, so they do not go to waste when the stoichiometric requirements are not met.

A possible implementation of the zeolite based catalysts could be in automobile vehicles. Since they have a natural capacitance for ammonia the waste will be lowered. Also, the copper only fills a very small portion of the zeolite, so in more complex pollution situations, other catalysts can be combined, to provide a variety of reactions in the same volume.