126b Kinetics of Nox Absorption into Aqueous Solutions of Oxone

Yusuf G. Adewuyi

The emission of NOx and SOx into the atmosphere is a major environmental concern because of their detrimental effects (e.g. acid rain) on mankind and its ecosystems. Scrubbing the gases with an aqueous alkaline slurry (or liquid) is a widely used treatment process and removes over 90% of the SO2 and particulate. However, nitric oxide (NO) has posed a persistent problem for industry in that it cannot be easily removed from incinerators and boilers by scrubbing as are nitrogen dioxide (NO2) and sulfur dioxide (SO2) due to its low solubility in water. Scrubbing with strong aqueous oxidants promises to be less expensive than competing post-combustion methods for NOx removal such as selective catalytic reduction (SCR) and thermal NOx removal. The goal of this project is to develop an innovative and cost-effective aqueous scrubber for the simultaneous removal and destruction of oxides using strong oxidizing agents such as oxone. Oxone (2KHSO5.KHSO4.K2SO4) is a triple salt of potassium and may be regarded as a mono-substituted derivative of hydrogen peroxide. However, it has an oxidation potential greater than that of hydrogen peroxide (E HSO5-/HSO4- = 1.82 eV compared to E H2O2/H2O = 1.77 eV). The aqueous absorption and kinetics of oxidation of nitrogen oxides (NOx) and SO2 by OXONE in a bubble column operated as batch or continuous OXONE is will be presented.

References

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