

# Aging Kinetics on Silver-Functionalized Silica Aerogel in Off-Gas Streams including Dry Air, Humid Air, NO and NO<sub>2</sub>

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## Abstract

Aging impact on silver-functionalized silica aerogel (Ag<sup>0</sup>-aerogel) in the off-gas streams including dry air, humid air, 1% NO/N<sub>2</sub>, and 2% NO<sub>2</sub>/dry air were studied. Aged Ag<sup>0</sup>-aerogel was prepared through a continuous-flow aging system by exposing Ag<sup>0</sup>-aerogel (unaged) to the off-gas streams at different aging temperatures and time. Iodine loading capacity on the aged Ag<sup>0</sup>-aerogel was obtained through a continuous-flow adsorption system. Iodine loading capacity losses were observed after the Ag<sup>0</sup>-aerogel was exposed to the off-gas streams. Characterization studies were conducted to observe the physical and chemical changes of the Ag<sup>0</sup>-aerogel after exposed to gas streams. According to iodine adsorption data and analyses, it was revealed that iodine loading capacity on the aged Ag<sup>0</sup>-aerogel in the off-gas streams decreases with increasing aging temperatures and time. The pseudo reaction model describes experimental data well and the oxidation of Ag<sup>0</sup> is the rate determining step in the aging process.

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