

# Styrene Epoxidation on Oxidized Silver

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## Abstract:

The epoxidation of olefins on Ag/O systems is a significant industrial-scale process within heterogeneous catalysis. However, the details of the surface reaction remain controversial, and it has been highly challenging to reconcile the findings from catalytic studies under reaction conditions with the highly detailed static studies under carefully controlled ultra-highvacuum (UHV) conditions. We combine molecular beam surface scattering and ion imaging techniques to explore the partial oxidation of styrene. This experimental approach enhances the sensitivity to the extent that we can directly observe the partial oxidation product, styrene oxide, under UHV conditions. We note that partial oxidation exclusively occurs at high oxygen coverages, which we attribute to the reaction of styrene with electrophilic oxygen formed specifically at elevated coverages.