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Laboratory-Measured Nucleation Rates of Sulfuric Acid and Water from the SO_2 + OH Reaction DAVID R. BENSON, LI-HAO YOUNG, SHAN-HU LEE, Kent State University — We present results of the laboratory study of sulfuric acid-water binary nucleation system. H_2SO_4 was produced through the reaction of SO_2 + OH $\rightarrow$ HSO_3 in the presence of SO_2, OH, O_2, and H_2O in a fast flow reactor at 288 K and atmospheric pressure. OH was produced from the photolysis of water vapor. The power dependence of nucleation rate (J) on sulfuric acid concentration ($[H_2SO_4]$) was 2 - 10 in the $[H_2SO_4]$ range from 3×10^6 - 1×10^9 cm^{-3}. This power dependence increased with decreasing RH and increasing nucleation time. The power dependence of J on RH was 10 - 15 for the RH values from 10 - 50%. The measured aerosol sizes ranged from 4 - 20 nm. These aerosol sizes were larger for higher $[H_2SO_4]$, higher RH, and higher nucleation times. The effects of RH on aerosol growth were also more pronounced at higher $[H_2SO_4]$ and with higher nucleation times.

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