

ABSTRACT

LABORATORY STUDIES OF THE SOLUBILITY OF ATMOSPHERICALLY IMPORTANT COMPOUNDS IN SALT SOLUTIONS

The uptake of water-soluble organic compounds by solutions containing inorganic salts has been investigated by bubbling a vertical stream of air through liquid solutions contained in a bubble chamber. A gas chromatograph with a flame ionization detector was utilized to quantify the equilibrium gas-phase concentrations of acetone, ethanol, and 1-propanol as a function of water, KNO_3 , and $(\text{NH}_4)_2\text{SO}_4$ salt concentration, and temperature at 295K, 303K, and 308K. Henry's Law solubility constants measured for ethanol, 1-propanol, and acetone at the indicated temperatures were in good agreement with the current literature and published values. In addition, Setchenow Coefficients for all the species studied were determined with a measurable change in the (H°/H) ratio by up to 34% over this temperature range. Overall, Henry's Law constants for these organic species were within 6-13% of the recommended literature and previous published values. This study indicates that the concentrations of water-soluble organics in aerosols are significantly lower than is currently believed.

Gail Ruth Walker
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