

OH WHERE OH WHERE IS OH? MEASURING THE ELUSIVE HYDROXYL RADICAL IN THE ATMOSPHERE USING LASER-INDUCED FLUORESCENCE

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The hydroxyl radical (OH) plays a central role in the chemistry of the atmosphere. In addition to controlling the lifetimes of many trace gases important to issues of global climate change and stratospheric ozone depletion, the OH radical initiates the oxidation of carbon monoxide and volatile organic compounds which in the presence of nitrogen oxides can lead to the production of ground-level ozone and secondary organic aerosols, the primary components of photochemical smog. Accurate measurements of OH radical concentrations in the atmosphere can provide critical tests of our understanding of atmospheric chemistry and ground-level ozone production in urban and rural areas.

Because of its high reactivity, mixing ratios of OH in the atmosphere are extremely low (typically less than 0.1 parts per trillion) and its chemical lifetime very short (less than 1 second). As a result, measurements of OH present a serious analytical challenge, especially on the timescale necessary to test our understanding of the fast photochemistry of the atmosphere. This presentation will describe the Indiana University laser-induced fluorescence instrument for the sensitive detection of OH radicals in the atmosphere, including recent results from several measurement campaigns in both urban and rural environments.