# INDIRECT DETERMINATION OF OH

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Integrated global OH estimations have been made in the past from an analysis of the emissions and atmospheric budgets and distributions of a variety of man-made halogenated species (methyl chloroform, dichloromethane, 1,2 dichloroethane and tetrachloroethylene) which are believed to be exclusively removed by reaction with OH and are considered to have no significant natural sources. Because of source complexities somewhat less precise estimations of OH have also be made by employing naturally occurring species such as $^{12}CO$ and $^{14}CO$. These techniques to date suggest that the seasonally averaged global OH abundance is about 5 x $10^5$ molec/cm$^3$.

More recently efforts are under way to develop indirect OH measurement techniques by utilizing tailor made "reactive OH tracers" to be employed in estimating OH abundance within air masses over a $10^2$-$10^3$km transport distance. By simultaneously releasing controlled quantities of reactive and inert tracers, both dispersion and OH abundance can be determined. When fully developed, the method will be useful at all expected levels of atmospheric OH concentrations ($<10^5$-$10^8$ molec/cm$^3$). A number of candidate "reactive OH tracers" have been selected after a careful screening process. Laboratory work is now under way to affirm the applicability of the selected chemicals to real world conditions.

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Comments

From considerations of ways to measure OH in the polluted Los Angeles environment using chemical releases, there are several hydrocarbons which by ratio measurements can achieve sensitivities of 2 to 3 $\times 10^6$. Toluene/benzene and ethyl benzene/benzene ratios can furnish $1 \times 10^6$. Other candidates are fluorinated hydrocarbons specially manufactured for the purpose.

Questions were raised as to the photochemistry of the species chosen, and whether they would perturb the local chemistry controlling OH. An inert tracer should always be released along with the reactive species. The mixing time should also be known well; if it is too close to the reaction time, that species is a poor choice unless an inert tracer accompanies it. The photochemical models should be used to design the release experiments.