

reaction process. The resultant effect in either case is the conversion of NO to NO₂ with a commensurate oxidation of reactive organic carbon to form organic oxidation products, CO₂, and H₂O.

The complex mixture of organic compounds present in the polluted atmosphere react with initiator radicals at different rates dependent upon their molecular structure, the result being varying yields of free radical species, ozone, NO₂, H₂O₂, peroxyacetyl nitrate (PAN) and other partially oxidized organic products as a function of VOC composition and VOC-NO_x levels.

Hydroxyl radical (HO) reactions seem to be the dominant gas-phase mechanism by which carbon monoxide, hydrocarbons, nitrogen dioxide and sulfur dioxide are consumed in the atmosphere.^{1,2,3} Interestingly enough, this highly reactive transient species, quite contrary to its organic free radical counterparts, shows limited variations in concentration with changes in atmospheric VOC and NO_x levels, a result readily explainable upon review of the free radical production and consumption sources. In the case of the hydroxyl radical, ambient conditions which enhance its production also tend to consume the radicals at an equivalent rate. The result is a faster cycling in the VOC-NO_x oxidation but very little perturbation in the HO steady state concentration. Under similar conditions an enhanced production of organic free radicals, mainly the peroxy species, is not offset by an increased consumption, and this results in increased steady state concentrations. Hence, the concentration of the organic free radicals is subject to variations due to changes in VOC and NO_x levels, in contrast to the HO concentration.

¹ See References on page 4-21.