methyl (CH_3), ethyl (C_2H_5), or another, more complex hydrocarbon radical. The paths by which these intermediates are formed and destroyed are important keys in explaining the chemical changes that occur in the polluted atmosphere.

6.1.1. Reactions Involving Oxides of Nitrogen

The major portion of the total oxides of nitrogen emitted by combustion sources is nitric oxide (NO). The rate at which NO is converted to nitrogen dioxide (NO_2) through oxidation by molecular oxygen in air:

$$2NO + O_2 \rightarrow 2NO_2 \qquad (6\text{-}1)$$

is proportional to the square of the nitric oxide concentration since two molecules of NO are required for the oxidation; it is, therefore, very sensitive to changes in nitric oxide concentration. Reaction 6-1 can be important in the vicinity of sources in converting up to 25 percent of the total NO_x to NO_2 during the initial stages of dilution with air when the concentration of NO is still quite high. Reaction 6-1 is much too slow, however, to account for the high conversion rates of nitric oxide to nitrogen dioxide observed in the atmosphere under typical ambient concentrations.

Since sunlight triggers the phenomenon of photochemical smog formulation, it is important to recognize those constituents that will absorb light energy. In some cases, these constituents decompose or become activated for reaction. Nitrogen dioxide, a dominant sunlight absorber in the urban atmosphere,