where

k_1 = the uninhibited rate constant

A,B = constants that are functions of the inhibitor

m = molar concentration of the inhibitor

The influence of inhibitors on the rate has been extensively studies by Schroeter (1963), and more recently by Altwicker (1979). According to Schroeter (1963), A and B are usually on the order of 10^{-5} molar, which means that inhibitor concentrations greater than 10^{-6} molar are effective. The form of the rate equation (Equation 2-31) suggests that the mechanism involves a bimolecular reaction between an inhibitor molecule and a radical in the chain.

In summary, our status of knowledge of the auto-oxidation reaction is:

1. The reaction is very slow.
2. The rate is extremely sensitive to the presence of catalysts and inhibitors.
3. The rate is first order in sulfite.
4. No reaction mechanism has been satisfactorily demonstrated to account completely for the observations of the more reliable studies (e.g., the dependence of the rate on $[H^+]^{0.5}$ found by Fuller and Crist, 1941 and by Larson et al., 1978).

2.3.4.2 S(IV) - catalyst - O_2 - H_2O System -- It is well-established that some metal cations catalyze the oxidation of HSO_3 and SO_3^{2-}. Of particular interest to the issue of atmospheric sulfur formation in particles, mist, fog, and rain