

Dennis et al. (1969), Weber (1970) and Stephens and McCalden (1971), which observed conversion rates an order of magnitude larger than more recent observations, must be considered suspect due to possible artifact formations in the sulfate analysis technique and limitations in the analytical methods in general.

Newman (1980) recently reviewed the majority of the power plant and smelter plume studies presented in Table 2-12 and arrived at the following conclusions.

- 1) The diurnal average oxidation rate of sulfur dioxide to sulfate is probably less than 1% per hour.
- 2) Little or no oxidation of sulfur dioxide occurs from early evening through to early morning.
- 3) Maximum oxidation rates of sulfur dioxide to sulfate of 3% per hour can occur under midday conditions.
- 4) The contribution of homogeneous and heterogeneous mechanisms to sulfur dioxide oxidation in plumes cannot be elucidated from the present studies.

It should be noted that the reported SO_2 oxidation rates are estimates based on analyses of measured physical and chemical parameters and in many instances have incorporated within them certain simplifying assumptions which are not totally substantiated. Typically uncertainties in reported values are 50%, but may be greater if inappropriate assumptions have been used. Even with these uncertainties in mind, the overall consistency in the observed range of SO_2 oxidation rates is gratifying.