263f Heterogeneous Oxidation Kinetics of Organic Aerosols

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Organic carbon (OC) comprises between 30 and 50 percent of ambient fine particulate matter. The many compounds in this OC fraction are vulnerable to oxidation by gas-phase oxidants such as OH and ozone, and yet the oxidation kinetics for these heterogeneous reactions are at best poorly understood. This is a particular problem for particles resembling real ambient particles rather than overly simplified model systems with a single or perhaps two components. Oxidation of OC will change the oxidation state and hygroscopic properties of organic particles, thus changing their effect on human health and climate. We present a basic formulation for relative kinetics measurements applied to heterogeneous oxidation of organic aerosols, and discuss observational evidence for oxidation found in ambient data. In addition, we present initial data on oxidation of complex mixtures modeling meat cooking and vehicular emissions. The meat cooking model is oxidized by ozone uptake, and the vehicular model is oxidized by OH radicals.