



## Reactive Oxygen Species Formed by Secondary Organic Aerosols and Mineral Dust in Surrogate Lung Fluid

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By applying electron paramagnetic resonance (EPR) spectrometry in combination with spin-trapping and inductively coupled plasma mass spectrometry (ICP-MS) techniques, we investigated the formation of reactive oxygen species (ROS) by secondary organic aerosols (SOA) and mineral dust in surrogate lung fluid (SLF). We found that under neutral condition, the lower solubility of transition metals in mineral dust resulted in slight enhancement of the ROS yield of isoprene and  $\alpha$ -pinene SOA. This was assumed to be weaker Fenton-like reactions induced by lower concentrations of water-soluble transition metals. In this case, the antioxidants in SLF could efficiently scavenge the generated OH radicals. However, under acidic condition, the higher solubility of transition metals in mineral dust resulted in significant enhancement of the ROS formation by SOA especially the isoprene SOA. Then the SLF contained antioxidants could not scavenge all the formed OH radicals. This was assumed to be stronger Fenton-like reactions induced by higher concentrations of water-soluble transition metals. Furthermore, we found that under both of the neutral and acidic conditions, the scavenge efficiency of SLF contained antioxidants toward organic radicals was low. Our findings imply that ROS yield of SOA particles can be enhanced significantly upon interactions with mineral dust under acidic conditions. Inhalation and deposition of SOA and mineral dust into human lungs may induce the formation of substantial amount of ROS, which may lead oxidative stress and organism disorders.