

# SOA: Anthropogenic-Biogenic Interactions

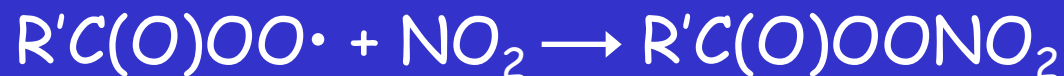
## Laboratory Studies

### Focus Questions

1. Fate of organic peroxy radicals in the gas phase
2. Particle-phase reactions
3. Physical state of organic aerosol particles
  - as affected by anthropogenic activities, and the impact on SOA production and climate-relevant SOA properties

Gas and particle-phase chemistry and phase interact to determine particle size and composition, in turn affecting hygroscopic, CCN, & optical properties

## Fate of organic peroxy radicals



increasing  
 $HO_2, RO_2\cdot, NO_x$

- Affected by  $HO_2, RO_2\cdot, & NO_x$  concentrations

## Particle-phase reactions



- Affected by organic composition, water, acidity, & phase

## Physical state of organic aerosol particles

Liquid, semisolid, solid (increasing viscosity)

- Affected by organic composition: oligomers & water

## Major potential anthropogenic affects on biogenic SOA:

$\text{NO}_x$ , VOC products & oligomer formation, acidity ( $\text{H}_2\text{SO}_4$ ,  $\text{HNO}_3$ ,  $\text{NH}_3$ , amines)

## Laboratory Study Needs

- More detailed lab studies to go along with SOA yield measurements - improve understanding of chamber environment and ability to extrapolate results to the atmosphere and improve models
- Quantitative data other than SOA yields & CHO
  - chemical tracers for testing models
    - > molecular product identification & yields and relation to SOA yield
    - > broad product classes: organic nitrates & sulfates
    - > functional groups
    - > oligomers
    - > standards
  - gas-particle partitioning (vapor pressures)
  - gas- and particle-phase kinetics

## Laboratory Study Needs

- Effects of VOC concentrations,  $\text{NO}_x$ , walls, lights, acidity, water, particle size
- Relationships between particle size & composition and hygroscopic, CCN, & optical properties

## Potential DOE/ASR Role

- Support single programs
- Support laboratory campaigns