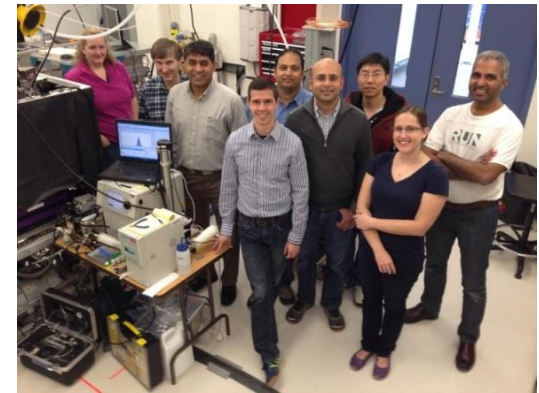
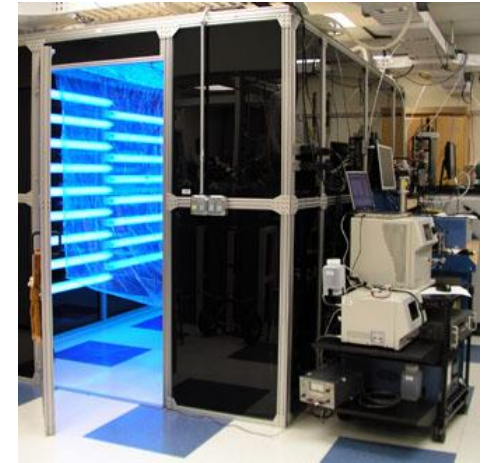
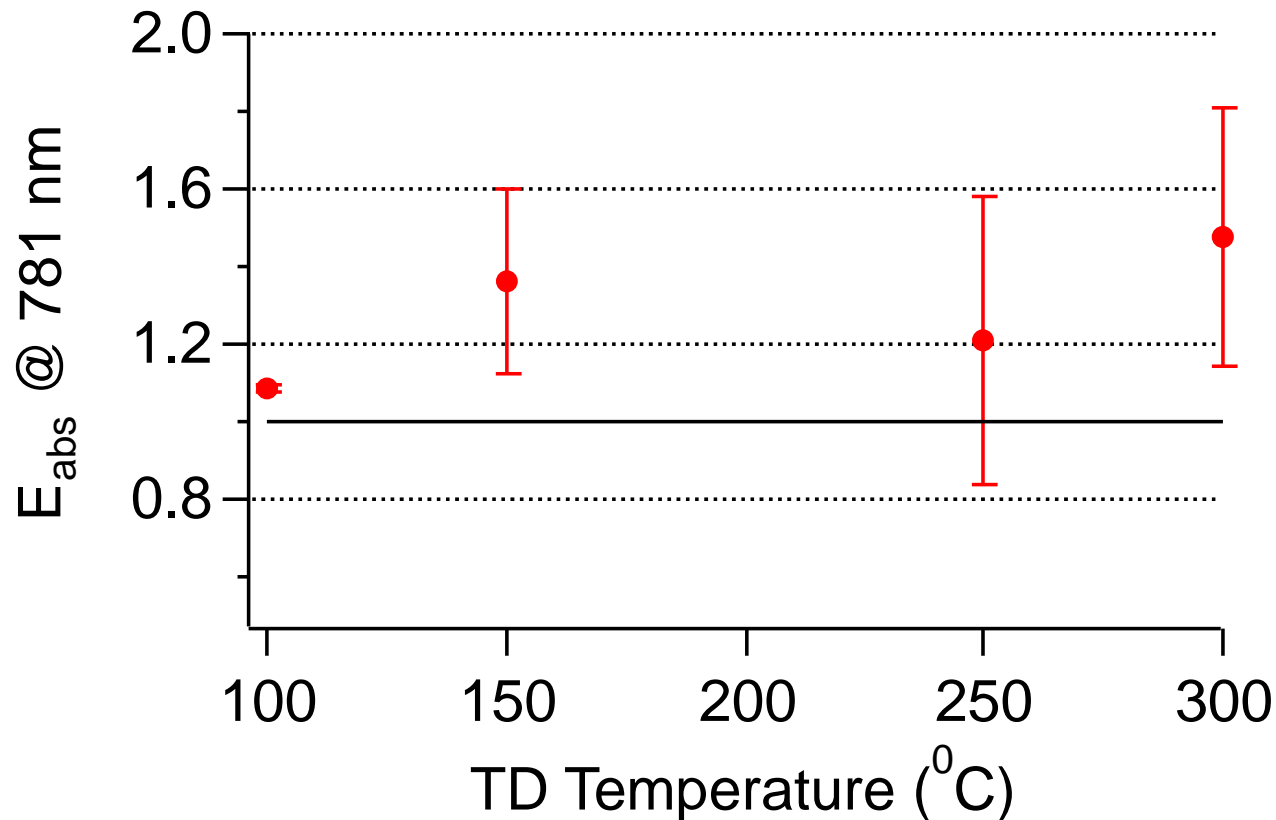


Soot Aerosol Aging Study (SAAS)

- **PNNL Environmental Chamber**
- **Simulating Atmospheric Aging**
 - Diesel soot (black carbon, BC)
 - “fresh” 120 nm diameter size-selected
 - α -pinene Secondary Organic Aerosol (SOA)
- **Large suite of instruments**
- **3 Kinds of Experiments**
 - SOA coatings on BC
 - SOA coagulated with BC (Sedlacek et al., 2012)
 - SOA coagulated with BC, then coated with more SOA
- **Dilution Studies**
- **Absorption (Enhancement) Studies**
 - Thermal Denuder (TD) at 300°C to remove SOA (Cappa et al., 2012)
 - **30% ($\pm 3\%$) loss in the TD - determined from SP2 number and mass**



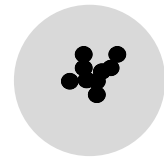
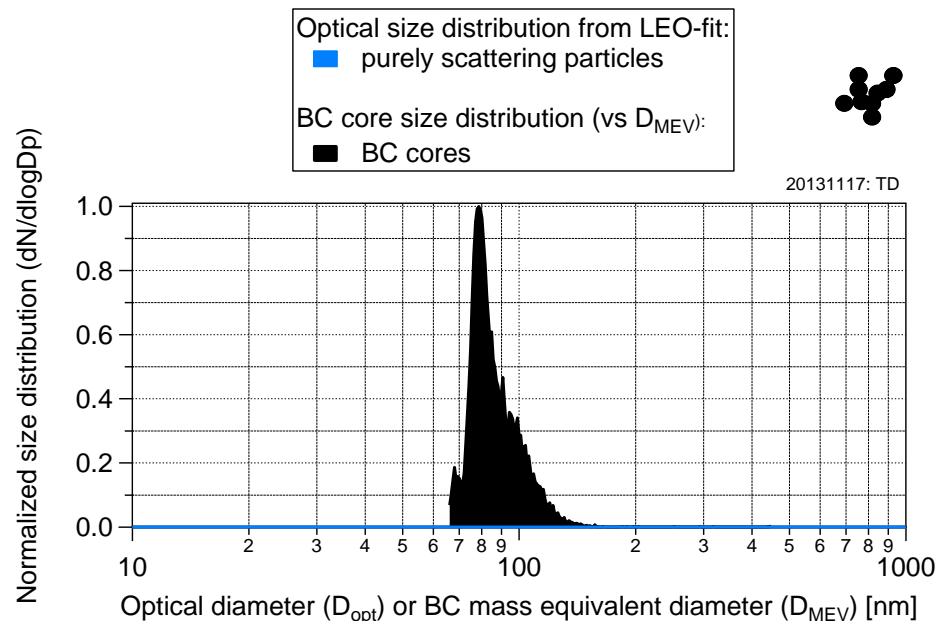
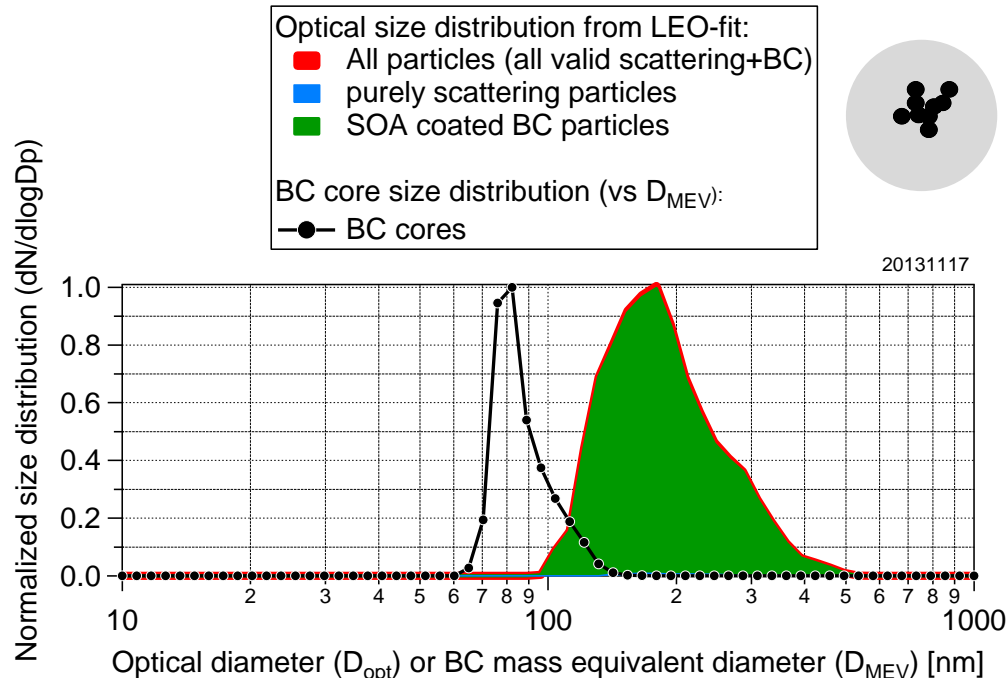
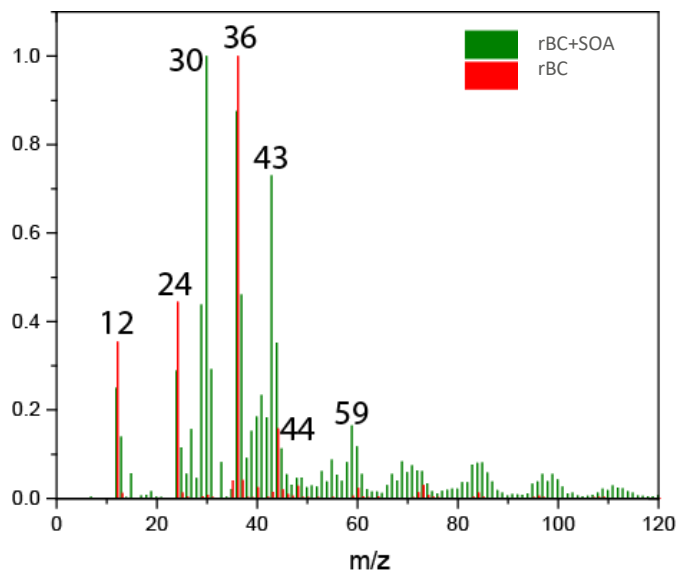
TD Method : E_{abs} @ 781 nm



- E_{abs} increases w/TD temp. (more complete SOA removal)

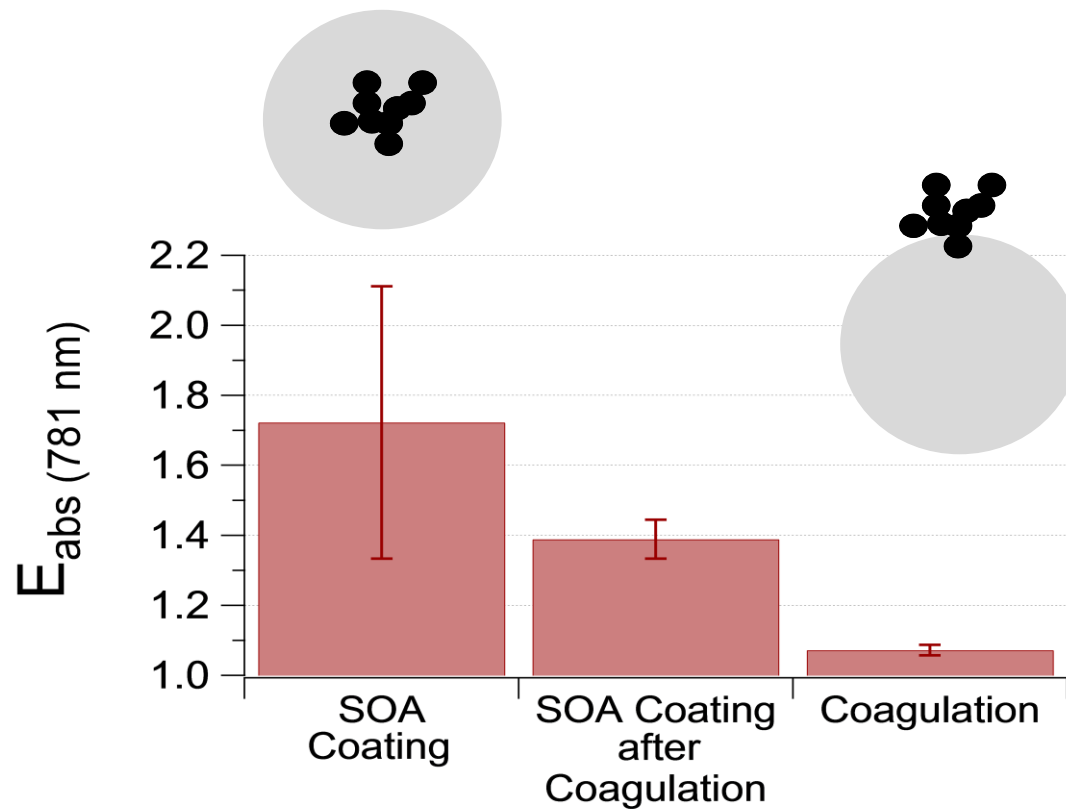
rBC Coating Analysis

- Coating thicknesses >50 nm
- SOA Coating removed at 300°C (SPLAT-II Mass Spectra and SP2)



781 nm Absorption Enhancement – Thermal Denuder Method

- Absorption enhancement (E_a) observed for thick SOA coatings, but minimal for coagulated BC (TD method; MAC is within 5%)



Preliminary Comparison with Mie Theory

Coating Experiment Measured Averages ($\lambda = 781$ nm)

rBC	MAC_{rBC} : 5.1	SSA_{rBC} : 0.03	E_{abs} : 1.0
rBC+SOA	$MAC_{rBC+SOA}$: 7.5	$SSA_{rBC+SOA}$: 0.67	E_{abs} : 1.5

Core-Shell Mie Calculations ($\lambda = 781$ nm)

Core RI = $1.82 - 0.74i$; Shell RI = $1.45 - 0i$

Core Dia. (nm)	Total Dia. (nm)	BC MAC	SSA	E_{abs}
84	84	4.0	0.03	1.0
84	270	8.1	0.75	2.1