



Direct measurement of the aerosol absorption and extinction cross section for a variety of chemical and biological simulants in the LWIR

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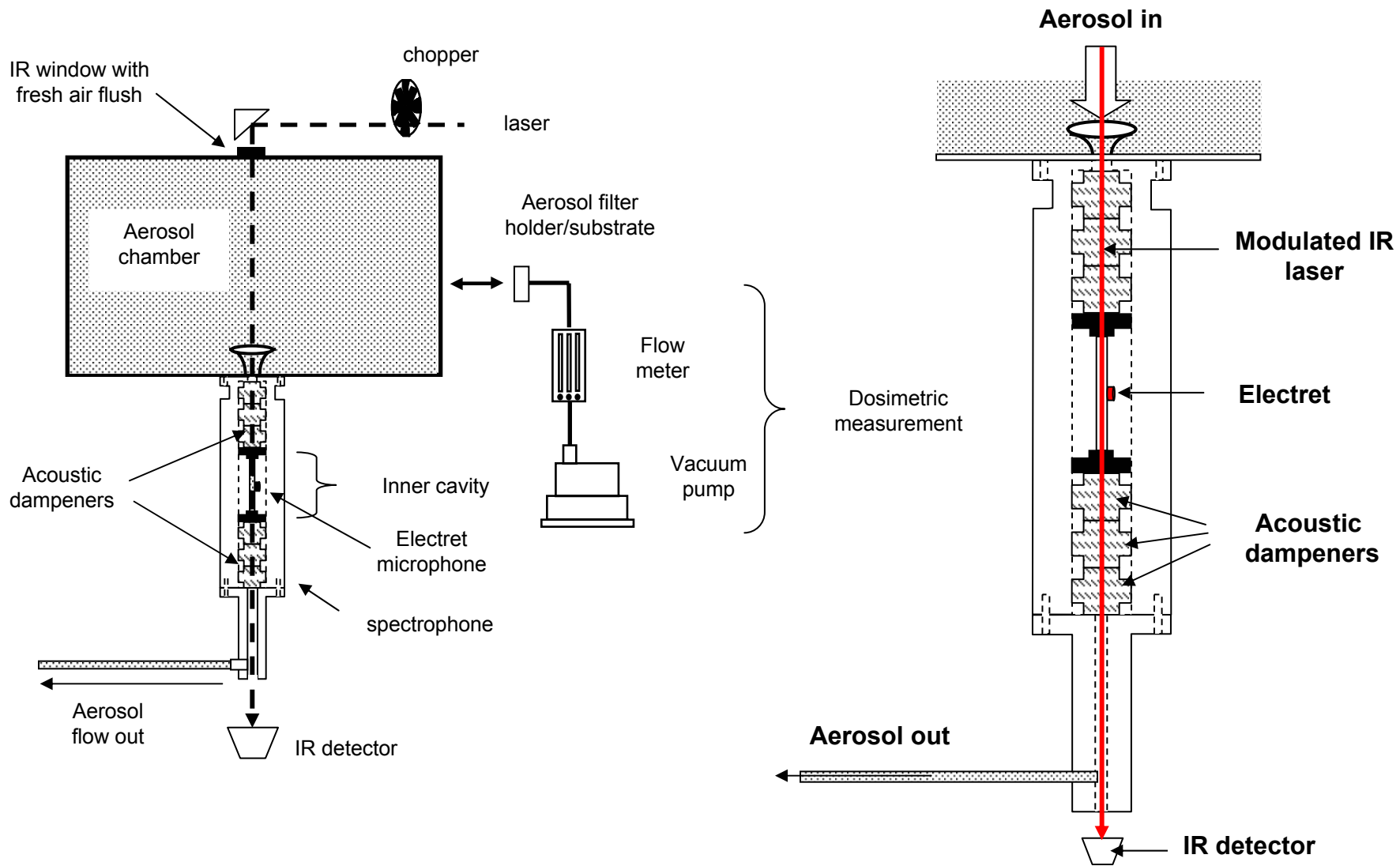
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***In situ* measurement of the mass normalized extinction and absorption coefficients for chemical and biological simulants using flow-through aerosol photoacoustics**



Aerosol spectroscopy using flow-through photoacoustics

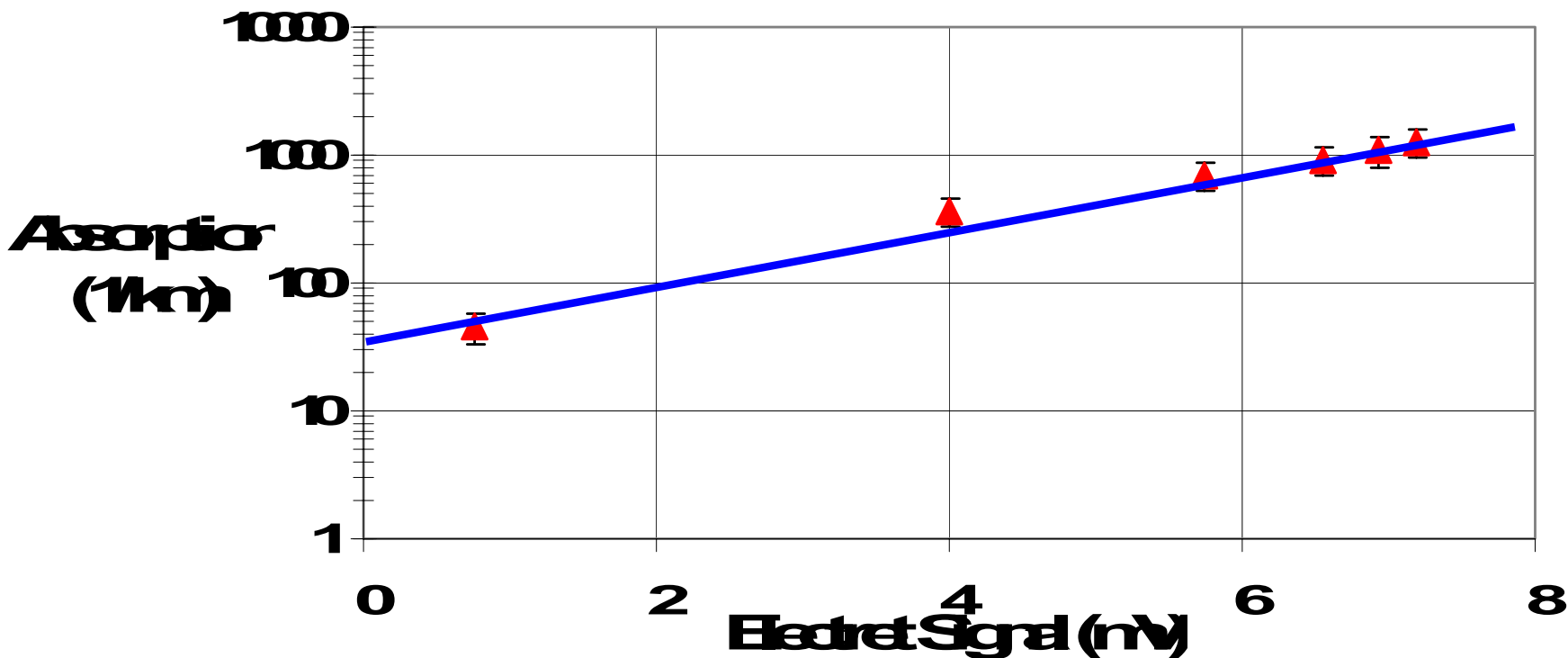




Typical spectrophone calibration using Isopropanol vapor

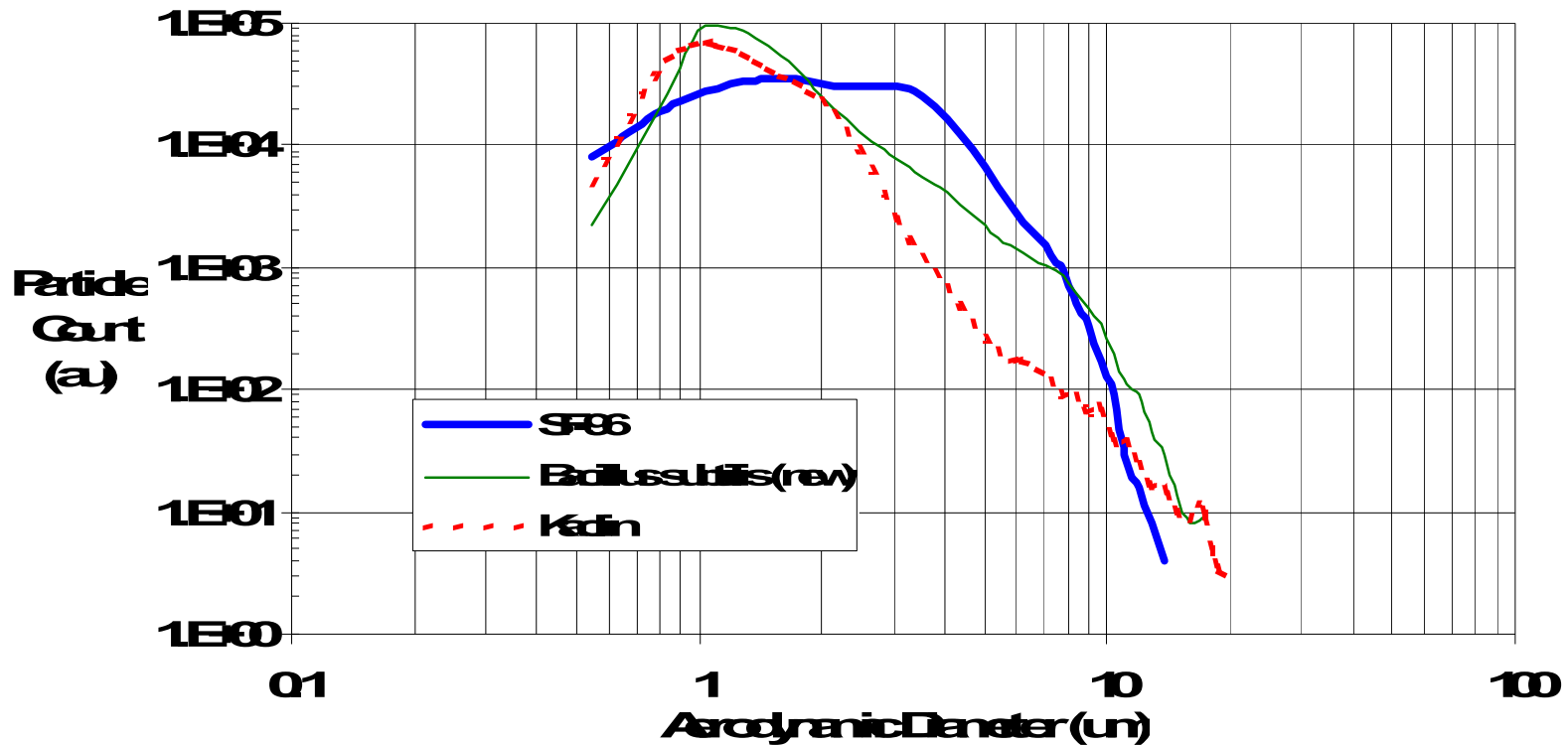
Extinction = scatter + absorption

For a calibration gas
extinction = absorption



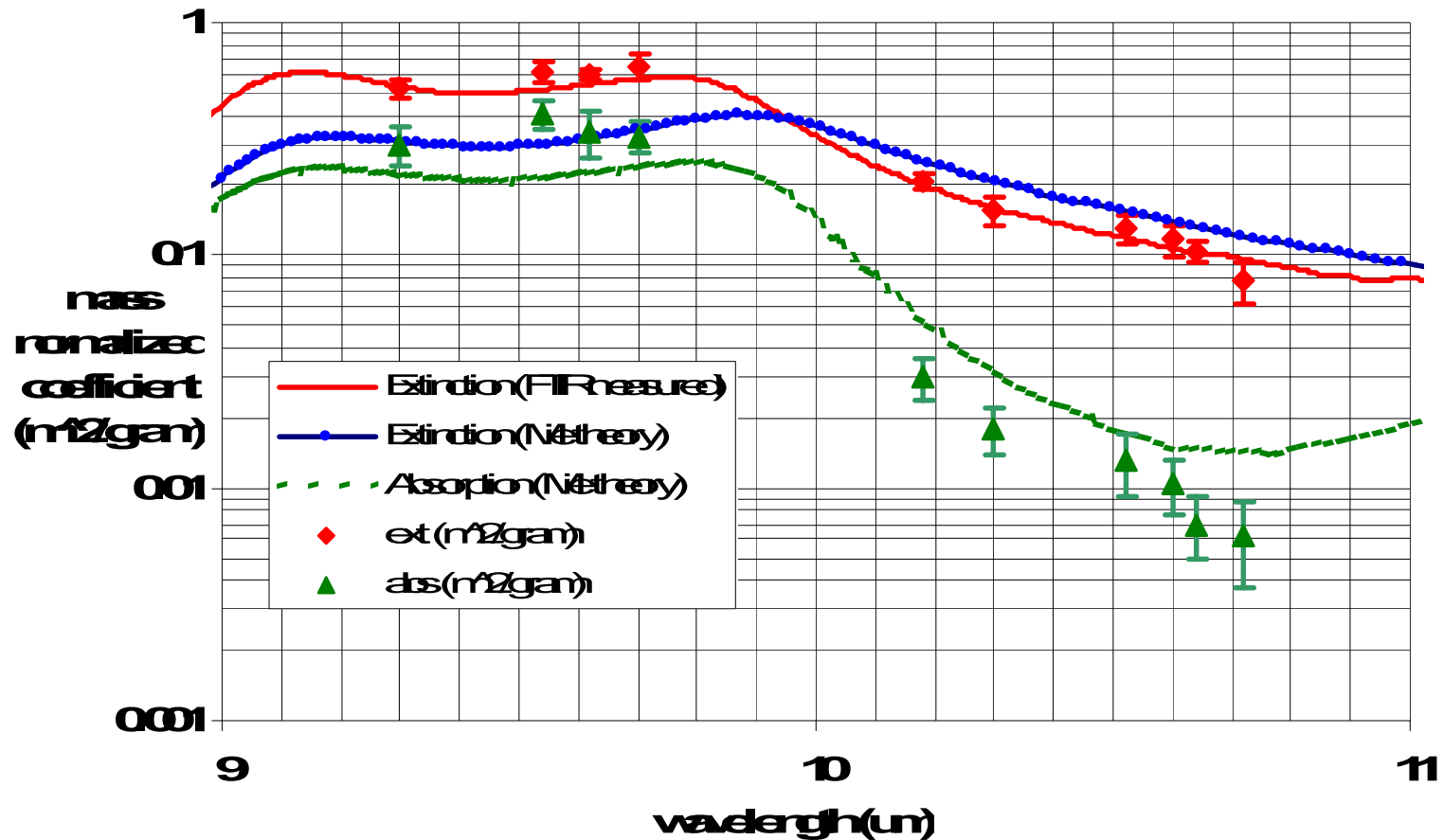


Measured size distributions for silicone oil SF-96, bacillus subtilis endospores, and Kaolin clay aerosol



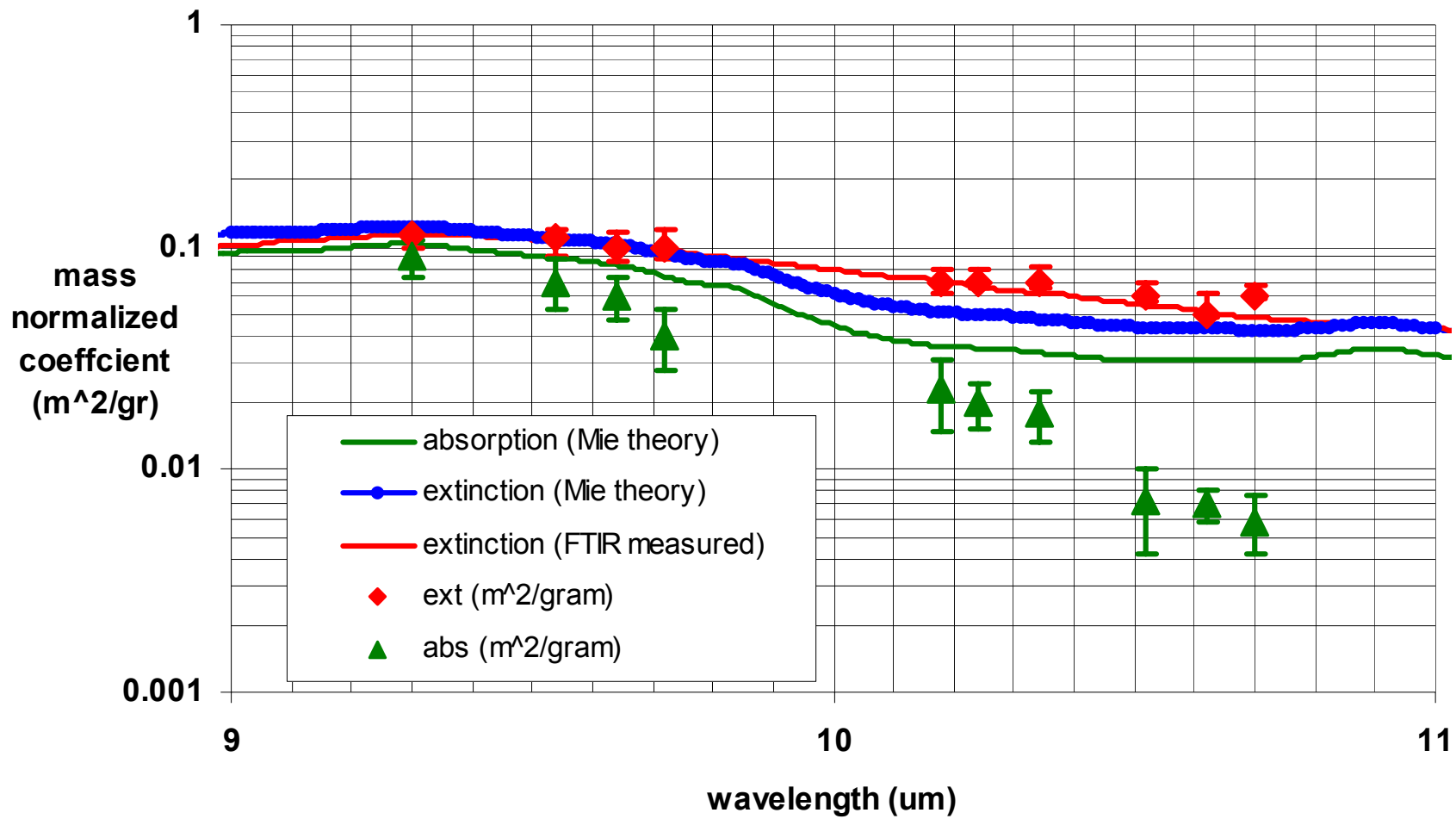


Comparison of the extinction and absorption cross-sections for aerosolized silicone oil SF-96, grade 50

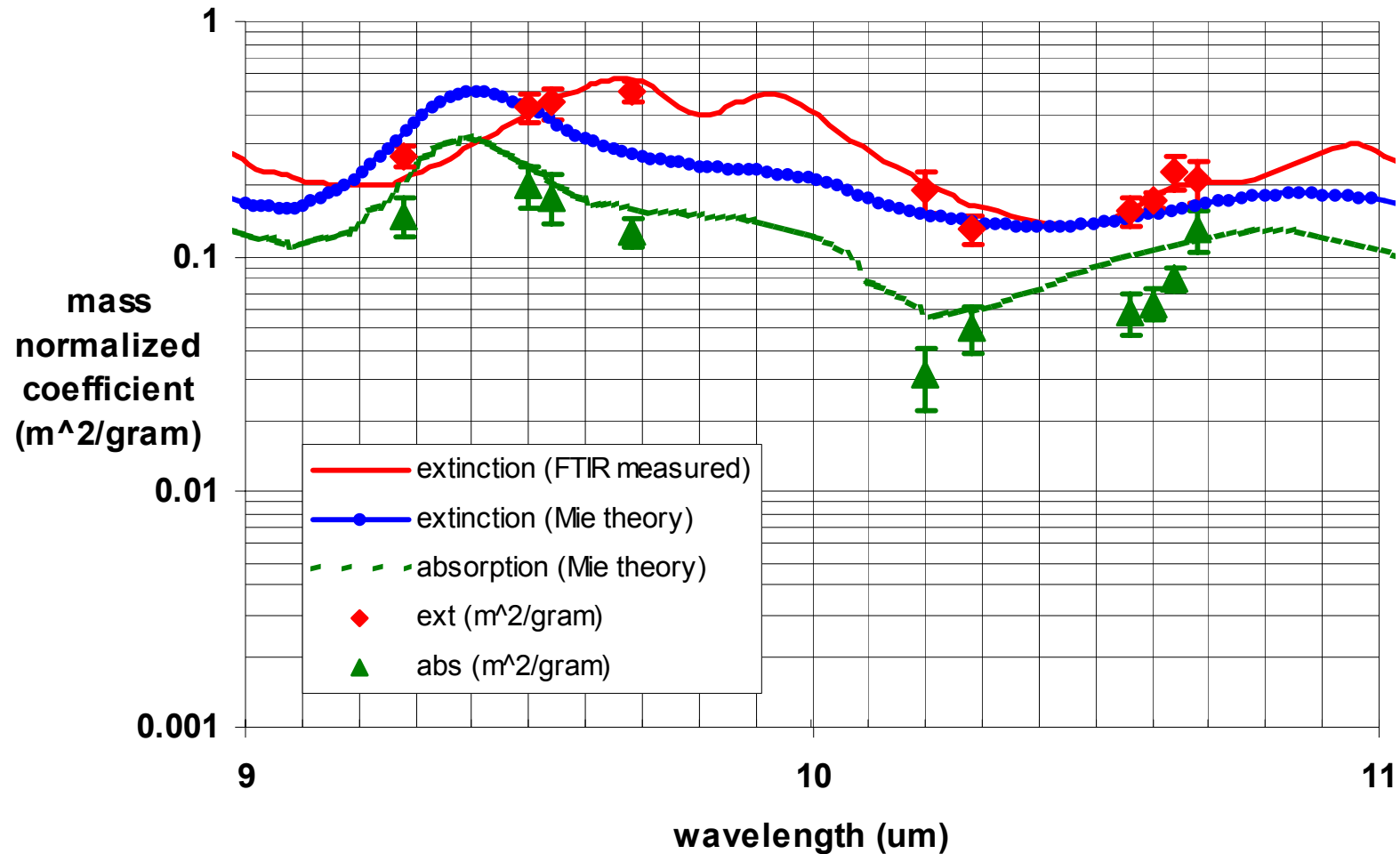




Comparison of the extinction and absorption cross-sections for aerosolized bacillus subtilis endospores



Comparison of the extinction and absorption cross-sections for Kaolin clay aerosol





Future



- Consider additional chemical and biological simulants, including other naturally occurring background aerosols.
- Extend photoacoustic study to incorporate MIR wavelengths by introducing a new tunable CO laser system, i.e., 5-6 μm .
- Begin to investigate the utility of a new/novel technique termed “Single particle emission spectroscopy”.

