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ABSORPTION ENHANCEMENT OF COATED BLACK DYED-PSL PARTICLES

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ABSTRACT

Aerosols can age through growth that involves aggregation of material on top of a core or through gas-solid reactions. In the case of black carbon (BC) this growth typically results in the development of a nonabsorbing transparent coating that has been reported to start developing within hours of BC generation. Recent numerical analyses show that absorption by aged BC could be 1.5 times greater than that of fresh aerosol. (Bond *et al*., 2006) However, experimental verification of this is difficult because two opposing processes are present: (i) collapse of the fractal structure of the nascent soot that causes a decrease in the mass absorption coefficient, and (ii) the growth of a transparent coating that increases the absorption coefficient. In order to help elucidate and to quantify these effects we have started to carry out experiments using a model system that enables us to separately study the coating effect on absorption without the complication of fractal collapse. By utilizing commercially available black dyed Polystyrene Latex (PSL) particles (D_p=200 nm and up) experiments will be carried out where a transparent coating can be grown on these particles and the change in the absorption coefficient measured as a function of coating thickness using Photothermal Interferometry [PTI]. (Sedlacek, 2006) Recently, photothermal interferometric technique has been successfully applied to the direct measurement of ambient aerosol absorption without interference from scattering. (Sedlacek and Lee, 2007) The ability to conduct aerosol absorption measurements *in situ* make the PTI technique ideal for quantifying the degree of absorption enhancement caused by the sulfuric coating. A discussion of the PTI technique, along with the results of an intercomparison with a PSAP and the aforementioned coating experiments will be presented.

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