Silicon particle synthesis and controlled appearance using thin films

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Silicon is a highly desirable material because of its relatively low absorption coefficient for visible light and relatively high refractive index, giving a high-quality factor for optical light scattering. This scattering is due to Mie resonance, where a single silicon particle demonstrates both magnetic and electric resonance upon illumination. However, in order to obtain such properties, the size, crystallinity and shape of the particle must be considered. In order to move from single particle scattering to 2D or 3D materials, batches of silicon particles with low dispersity need to be produced. The first part of this seminar, will explore ways in which silicon has been produced for light manipulation, which includes supercritical synthesis, thermal disproportionation and a redox synthesis method. In the second half of the presentation, we will discuss how structural color can be created via the fabrication of metal oxide thin films and how nanostructure can create iridescence and haze.