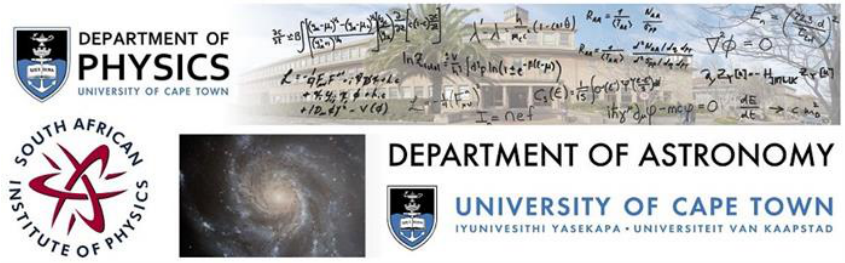

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Thermal effects on the plasmonic properties of Ag embedded glass based metamaterials

Friday, 8 July 2016 10:00 (20 minutes)

Abstract content
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Plasmon resonance in noble metals such as Ag, Cu and Au at the nanoscale is technologically important for various applications as it opens up a new horizon at the nanoscale. Silver embedded in a soda-lime glass matrix was synthesized by the ion-exchange (Ag+ - Na+) method followed by thermal annealing in an air atmosphere. The effects of annealing temperature and time on the plasmonic response and optical activity of the silver in soda-lime glass have been investigated using Ultra violet-visible absorption spectroscopy and photoluminescence. The surface plasmon resonance (SPR) at a hybrid metal–dielectric interface for silver was shown to be influenced by the presence of Ag+ ions and the increased particle size of the Ag nanoparticles as a function of post annealing temperature. This study revealed that the SPR and the luminescence properties were strongly dependent on the glass matrix, which could not be achieved in all types of glass slides. During annealing the Ag+ is reduced to Ag0 atoms and subsequently forms silver nanoparticles in the oxidizing atmosphere. The particle sizes calculated from Mie theory were in excellent agreement with the size measured from Field Emission Gun Transmission Electron Microscope (FEGTEM). The nano-sized Ag nanoclusters on the glass matrix may be suitable for the future prospective for potential applications in optical data storage devices.

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