Optically Switchable and Rewritable Phase-Change (Dielectric) Metamaterials

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Switchable and nonlinear metamaterials, with properties surpassing those of natural media, will underpin the next stage of the photonic technological revolution, providing a functional platform for nanoscale 'meta-devices', and it has been seen recently that all-dielectric architectures can deliver metamaterial functionalities free from the high resistive losses inherent to noble metal frameworks. Phase-change media take us a step further by providing for optically-driven, non-volatile switching, tuning and reconfiguration of meta-devices. We report here on recent advances in the development of versatile, planar photonic chalcogenide metamaterials to provide a new generation of nanoscale optical switching and memory devices.