

Chalcogenide glasses – a versatile platform for innovations in the infrared

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Non-oxide glasses based on chalcogen (group VI) materials are transparent media that allows a view into spectral regions where biological, chemical and other optical signatures of our daily life, reside. Next generation electro-optical /infrared (EO/IR) optical components and sensors which allow us to 'see' into this region, require novel optical materials that serve specified optical functions and possess attributes which can be tailored to accommodate specific optical design, manufacturing or component/device integration constraints. This includes the ability to engineer not only optical properties and function, but also thermal and mechanical properties key to meeting fabrication and environmental demands. Over the past decade efforts by the UCF team and our collaborators have focused on developing a toolbox of glass material chemistry options, processing methodologies and metrology tools that employ multi-component non-oxide chalcogenide glasses (ChGs). Basics of these versatile materials are discussed in this presentation as well as key challenges in optical material design, manufacturing and characterization that are being examined to create innovative solutions to further integrate these materials into bulk and planar applications for sensing, security and defense applications.