
Chalcogenide glasses and fibers for infrared photonics

Jean-Luc Adam^{*1}

¹Verres et céramiques - ISCR – Centre National de la Recherche Scientifique - CNRS, Université de Rennes I – France

Abstract

Vitreous materials composed of chalcogen elements (S, Se, Te) show broad transparency windows that span from the visible up to 12-15 μm , depending on their compositions. This is due to the lower phonon energies of chalcogenides, which are also responsible for enhanced luminescence of rare-earth ions embedded in such matrices. In addition, chalcogenide glasses contain large polarisable atoms and external lone electron pairs that induce exceptional non-linear properties. These unique properties, combined with a good ability of chalcogenide glasses to be obtained in the form of bulk optics, optical fibers or channel waveguides, open the way to a large range of applications like thermal imaging, infrared light generation, or infrared optical sensing. The presentation will illustrate the great affinity of chalcogenide glasses for infrared photonics, especially in the field of optical sensors based on chalcogenide fibers for *in situ* and real-time identification of chemical species, with a focus on *in operando* tracking of the chemistry evolution in Li-ion batteries

Keywords: chalcogenide, glass, fiber, sensor, infrared, optical

^{*}Speaker