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Fluoride glasses and fibers for mid-infrared applications

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Fluoride glasses are the only infrared material that transmits light from the UV to up the mid-infrared region without any absorption peaks, and can be drawn in high quality optical fibers, ready for very demanding industrial applications. Fluoride glasses are known since 1975. They have been discovered at Rennes University. The initial commercial fibers have suffered from high loss and low strength. In the past few years, tremendous progress has been made in fluoride glass fibers. Current commercial fluoride fibers have loss ranging from 30 to 150 dB/km and mechanical strength ranging from 75 to 135 kpsi depending on fiber geometry and parameters. Fluoride fibers are now ready for industrial applications such as defense, spectroscopy, fiber lasers and amplifiers, supercontinuum and sensing. More recently, indium fluoride fibers have been intensively developed to enlarge the transmission window and open new application fields. In fact standard fluoride glass fibers based on zirconium fluoride, and commonly called ZBLAN has a transmission window ranging from 0.3 to 4.3 microns. While, indium fluoride glass fiber has a transmission window ranging from 0.3 up to 5.5 microns. Furthermore, indium fluoride glasses have a lower phonon energy compared to zirconium fluoride, which make them host of choice for active application. This presentation will report the latest development of fluoride glasses and fibers.

Biography

Mohammed Saad has more than 30 years of experience in optical materials and fiber optics research, especially fluoride. He holds a PhD since 1986 in infrared optical materials and infrared optical fibers, from Rennes University in France. Formerly, he held the position of Senior Researcher at Laboratoire des Matériaux Photoniques at Rennes University, and was Head of the Mid infrared optical fiber (MIR) program at Institut National d'Optique (INO) in Quebec city. In 2003, he founded Irphotonics a world leader in fluoride glasses and fibers. Since January 2013, he is Senior Glass Scientist at Thorlabs, Inc., in New Jersey. He chaired many international conferences on infrared optical glasses and fiber applications and is the author and co-author of more than 60 papers and presentation, including 12 invited talks on fluoride glasses and fiber technology.

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