

**Invited paper**

**New materials and devices in Raman amplification**

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**Abstract**

*At present for the creation of Raman lasers and amplifiers for numerous applications various glass optical fibers and crystals are mainly used. In recent years silicon photonics technology has made rapid progress and Raman silicon lasers and amplifiers have been successfully demonstrated. Recent results on new Raman materials and devices are reviewed.*

**Extended Abstract**

Many materials (solids, liquids and gases) can be used for Raman amplification. At present for the creation of Raman lasers and amplifiers for numerous applications various glass optical fibers and nonlinear crystals are mainly used.

Advantages of glasses as a Raman material are connected with the possibility to change to a great extent by the glass composition Raman gain and frequency shift, transmission window and others characteristics. The wide use of silica-based fibers is explained by a well-developed technology, low optical losses and compatibility with the existing fiber optical systems. Phosphosilicate and germania-based fibers are promising for the creation of Raman lasers because of large Raman shift and higher Raman gain correspondingly compared to silica fibers. TeO<sub>2</sub>-based fibers attract much attention because of high Raman gain and amplification bandwidth and wide transmission window.

Bismuth oxide fibers are also considered as a candidate for high Raman gain material.

In recent years silicon photonics technology has made rapid progress and Raman silicon-based lasers and amplifiers have been successfully demonstrated. Silicon is advantageous as a Raman material in the near-and mid-infrared regions because of its high Raman gain and optical transparency in these regions. Recent results on new Raman materials and devices are reviewed.



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Prof. EVGENY M.DIANOV is director of the Fiber Optics Research Center of the Russian Academy of Sciences. He graduated from Moscow State University in 1960 and began his scientific career in P.N.Lebedev Physical Institute of USSR Academy of Sciences.

His research interests are in fiber optics, laser physics and nonlinear optics. Prof. E.M.Dianov has more than 600 publications in scientific journals. He is a Member of IEEE and MRS, a Fellow of OSA and a Full Member of the Russian Academy of Sciences.