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Er silicate nanowire light source for silicon photonics

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In recent years, Er silicates and Yttrium (Y) and Ytterbium (Yb) co-doped Er silicates have attracted intensive investigations due to their efficient luminescence at 1.53μm. Compared with traditional Er-doped materials, the Er concentrations of silicates are about 1 to 2 orders of magnitude higher due to the stoichiometric nature of these Er compounds. However, it turned out that its large Er silicate waveguide transmission loss and high pumping power required inhibited the possibility of achieving high gain with device size scaled down. In order to solve the problems mentioned above, we use single crystal Er-Yb/Y silicate compound nanowires as the waveguide material to reduce the transmission loss due to fewer defects in single crystal nanowire. In addition, the quantum confinement effect existed in single crystal nanowire can improve the emission lifetime of the erbium, so that it will be much easier to achieve the erbium ion population inversion. In this talk, we will introduce our group recent work about Er/Yb/Y silicates nanowire waveguide materials. Firstly, we fabricated the Er silicate compound nanowire by a chemical vapor deposition method. The strong 1.53μm gain characteristics of $Er_xYb(Y_{)2-x}SiO_5$ nanowire have been obtained. This property of Er silicate nanowires indicate that it is a promising material for achieving high gain nanowire optical waveguide amplifier and laser.

Biography:

Xingjun Wang received the B.E., M.E. and Ph.D. degrees from the Dalian University of Technology, China in 1999, 2002 and 2005, respectively. From 2007 to 2009, he was a JSPS postdoctoral follow in Department of Electronic Engineering, University of Electro-Communications, Japan. In 2009, he joined Peking University, and is currently a full professor at Peking University, Beijing, China. Now he is devoted into Si photonics, including the Si based light source and Si optoelectronic integration chip for high speed optical communication. He has published more than 130 papers on international journals and conference proceedings. The 50 papers have been SCI indexed. The citation reaches 500 times.