Abstract

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Second harmonic generation in thin optical fibers via cladding modes

Since silica goes under the category of amorphous materials, it is difficult to investigate important processes such as second harmonic generation (SHG) in silica-based fibers. In this paper, we proposed a method for SHG relaying on cladding modes as pump modes. Cladding modes are introduced in optical fibers through tilted long period grating (TLPG), where power of core mode is transferred into cladding modes. By functionalizing T-LPG with nonlinear coating, the interaction occurs between cladding modes and the coating material, consequently second harmonic signal (SHS) is generated with efficiency up to 0.14%.