

## Stable multi-wavelength erbium-doped fiber laser assisted by graphene-PMMA thin film

### ABSTRACT

Multi-wavelength erbium-doped fiber laser (EDFL) is of significant interest due to its operation within the conventional optical communication band. The primary concern in multi-wavelength EDFL is the low stability of its gain medium in room temperature. This work proposed the use of graphene-polymethyl methacrylate (PMMA) thin film as a stabilizer and nonlinear medium to generate stable multi-wavelength EDFL. Six channels with a constant spacing of 0.62 nm are observed within 10 dB peak power difference. The peak power stability of these lasers is measured at less than 0.8 dB within an observation time of 300 min. These findings validate the potential of graphene/PMMA thin film stabilizer as a key element in producing simple and highly stable multi-wavelength EDFL structure.

**Keyword:** Fiber laser; Multi-wavelength; Erbium; Graphene