

# Abstract

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## **EDFA gain flattening using fiber Bragg gratings employing different host materials**

In this paper, erbium-doped fiber amplifier (EDFA) gain flatness is studied using cascaded fiber Bragg gratings (FBGs) with different numbers. The gain characteristics are investigated in reference to the wavelength, EDFA length, erbium ion density, and erbium radius. Three host materials are used: conventional silica, fluoride, and alumino-germanosilica, depending on their absorption and emission cross section areas. The conventional silica exhibits a high gain of 38.5 dB before flattening with an in-band gain of 6.5 dB. After flattening, the gain is reduced to 29 dB with a relative gain difference of 1.3% with 10 FBGs. The bandwidth of 28.42 nm is realized with 20 and 10 FBGs while the 30 FBGs configuration achieves a slightly lower value of 25 nm. The fluoride as host material depicts a lower gain after flattening of 12 dB, minimum relative gain difference of 10% with 30 FBGs and bandwidth of 28.42 nm. The alumino-germanosilicate depicts the highest gain of 30 dB with 28 nm bandwidth flattened with a relative gain difference of 1% at 30 FBGs configuration.