

of 300 fs, FWHM bandwidth of 12 nm, an output power of 3.85 mW, and peak intensity of 211.7 MW/cm².

5. Conclusion

In this paper, a mode-locked Er-doped fiber laser was presented with a sandwich-type single wall carbon nanotubes (SWNTs) saturable absorber (SA). It was newly shown that the SWNT-SA can be graphitized by the laser-heating over the threshold power causing the film surface damage, which is consistent with the known fact of the multi-wall carbon nanotubes films. The graphitization of SWNT-SA was experimentally verified by measuring the surface morphology, Raman spectra, and SEM images. By designing the laser pump power lower than the threshold power of 106 mW, the proposed system guaranteed the stably mode-locked output pulse with a 300 fs pulse duration, 12 nm FWHM bandwidth, 3.85 mW output power and 211.7 MW/cm² peak intensity over 300 hours. The damage threshold peak intensity for the SWNT-SA in the cavity is the range of 220-240 MW/cm². The graphitization occurs on the SWNT-SA after irradiation over threshold energy.

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