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Q-switched pulse generation in L-band region with polyacrylonitrile saturable absorber

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Abstract
In this study, we assess the practicality of using Polyacrylonitrile (PAN) as a saturable absorber (SA) for generating Q-switched pulses within an erbium-doped fibre laser (EDFL) cavity. A successful combination of PAN, a resin material, and polyvinyl alcohol resulted in the formation of a SA film. This film was utilised to generate stable Q-switched pulses operating in a long-wavelength band of 1572 nm. The greatest repetition rate achieved was 66.1 kHz, while the minimum pulse width was 2.43 μs. The maximum pulse energy was achieved at 52 nJ and measured at a pump power of 175.9 mW. To the best of our knowledge, this study is the first report of EDFL passive Q-switching employing a PAN absorber. © 2024 IOP Publishing Ltd.

Author Keywords
EDFL; L-band; polyacrylonitrile; Q-switched laser; thin film

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76

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