

< Back to results | 1 of 1

Export Download Print E-mail Save to PDF Add to List More... >

[Full Text](#) View at Publisher

Journal of the European Optical Society  
Volume 10, 2015, Article number 15015, 5p

## Flat-gain wide-band erbium doped fiber amplifier by combining two difference doped fibers (Article)

Hamida, B.A.<sup>a</sup>, Azooz, S.M.<sup>b</sup>, Jasim, A.A.<sup>b</sup>, Eltaif, T.<sup>c</sup>, Ahmad, H.<sup>d</sup>, Khan, S.<sup>a</sup>, Harun, S.W.<sup>b</sup>

<sup>a</sup>Department Electrical and Computer Engineering, International Islamic University Malaysia, Malaysia

<sup>b</sup>Department of Electrical Engineering, University of Malaya, Malaysia

<sup>c</sup>Multimedia University, Melaka, Malaysia

View additional affiliations

### Abstract

View references (15)

A new erbium-doped fibre amplifier (EDFA) is demonstrated using a combination of newly developed Erbium Zirconia co-doped fiber (Zr-EDF) and the commercial silica-based Erbium-doped fiber (Si-EDF) as the gain medium. Both fibers have a very high concentration of erbium ion. A compact amplifier operating in C-band region is firstly reported using a double-pass configuration. It is shown that average gains of the proposed Zr-EDF amplifier are obtained at approximately 18 dB with a gain variation of 2 dB within C-band region. A flat-gain and wide band operation is achieved by configuring the amplifier in two stages comprising a 2 m long Zr-EDF and 9 m long Si-EDF optimised for C- and L-band operations, respectively, in a double-pass parallel configuration. A chirp fibre Bragg grating (CFBG) is used in both stages to ensure double propagation of the signal and thus to increase the attainable gain in both C- and L-band regions. At an input signal power of 0 dBm, a flat gain of 15 dB is achieved with a gain variation of less than 0.5 dB within a wide wavelength range from 1530 to 1605 nm. The corresponding noise figure varies from 6.2 to 10.8 dB within this wavelength region. © 2015 European Optical Society (EOS). All rights reserved.

### Reaxys Database Information

[View Compounds](#)

### Author keywords

Double-pass amplifier Wideband amplifier Zirconia-based erbium-doped fiber

### Indexed keywords

Engineering controlled terms: Broadband amplifiers Erbium Fiber amplifiers Fibers Noise figure Silicon Zirconia Zirconium

Compendex keywords: Compact amplifiers Double pass amplifiers Double pass configuration Erbium doped fibers Input signal power Parallel configuration Silica based Erbium-doped fibers Wavelength regions

Engineering main heading: Erbium doped fiber amplifiers

### Metrics

0 Citations in Scopus

0 Field-Weighted

Citation Impact



### PlumX Metrics

Usage, Captures, Mentions, Social Media and Citations beyond Scopus.

### Cited by 0 documents

Inform me when this document is cited in Scopus:

[Set citation alert >](#)

[Set citation feed >](#)

### Related documents

Flat-gain wide-band erbium doped fiber amplifier with hybrid gain medium

Hamida, B.A. , Azooz, S.M. , Jasim, A.A. (2016) *Optik*

Wideband and compact erbium-doped fiber amplifier using parallel double-pass configuration

Hamida, B.A. , Cheng, X.S. , Harun, S.W. (2012) *Microwave and Optical Technology Letters*

Wideband and flat-gain amplifier based on high concentration erbiumdoped fibres in parallel double-pass configuration

Hamida, B.A. , Cheng, X.S. , Harun, S.W. (2012) *Quantum Electronics*

View all related documents based on references

Find more related documents in Scopus based on:

## References (15)

[View in search results format >](#) All  Export  Print  E-mail  Save to PDF  Create bibliography

- 
- 1 Mohammed, A., Rashed, A.N.  
Ultra wide band (UWB) of optical fiber Raman amplifiers in advanced optical communication networks (2009) *J. Media Commun. Stud.*, 1, pp. 56-72.
- 
- 2 Harun, S.W., Tamchek, N., Poopalan, P., Ahmad, H.  
**Double-pass L-band EDFA with enhanced noise figure characteristics**  
(2003) *IEEE Photonics Technology Letters*, 15 (8), pp. 1055-1057. Cited 38 times.  
doi: 10.1109/LPT.2003.815342  
[View at Publisher](#)
- 
- 3 Wadi Harun, S., Kamilah Saat, N., Ahmad, H.  
**An efficient S-band erbium-doped fiber amplifier using double-pass configuration**  
(2005) *ieice electronics express*, 2 (6), pp. 182-185. Cited 29 times.  
doi: 10.1587/elex.2.182  
[View at Publisher](#)
- 
- 4 WANG, X., NIE, Q., XU, T., SHEN, X., DAI, S., GAI, N.  
**Tm<sup>3+</sup>-doped tellurite glass with Yb<sup>3+</sup> energy sensitized for broadband amplifier at 1400-1700 nm bands**  
(2008) *Journal of Rare Earths*, 26 (6), pp. 907-911. Cited 14 times.  
doi: 10.1016/S1002-0721(09)60031-4  
[View at Publisher](#)
- 
- 5 Ellison, A., Dickinson, J.E., Goforth, D.E., Harris, D.L., Kohli, J.T., Minelly, J.D., Samson, B.N.  
Hybrid erbium silicateconventional-band fiber amplifier with ultra-low gain ripple  
*Proceedings to Optical Amplifiers and Their Applications*  
NW2 (Optical Society of America, Nara, 1999)
- 
- 6 Wysocki, P.F., Park, N., DiGiovanni, D.  
**Dual-stage erbium-doped, erbium/ytterbium-codoped fiber amplifier with up to +26-dBm output power and a 17-nm flat spectrum**  
(1996) *Optics Letters*, 21 (21), pp. 1744-1746. Cited 20 times.  
[View at Publisher](#)
- 
- 7 Desurvire, E., Bayart, D., Desthieux, B., Bigo, S.  
(2002) *Erbium-Doped Fiber Amplifiers, Device and System Developments*. Cited 138 times.  
John Wiley & Sons Inc., New York
- 
- 8 Kakui, M., Kashiwada, T., Nakazato, K., Onishi, M., Fukuda, C., Shigematsu, M., Nishimura, M.  
**Design Optimization of Hybrid Erbium-Doped Fiber Amplifiers for WDM Transmission Systems**  
(1997) *Optical Fiber Technology*, 3 (2), pp. 123-133. Cited 6 times.  
doi: 10.1006/ofte.1997.0205  
[View at Publisher](#)
-

- 9 Nilsson, J., Jaskorzynska, B.  
Alternating Cascade of Spectrally Different Erbium-Doped Fiber Amplifiers for Link-Loss-Insensitive Long-Haul WDM Transmission  
(1999) *Journal of Lightwave Technology*, 17 (3), pp. 434-444. Cited 2 times.  
doi: 10.1109/50.749383  
[View at Publisher](#)
- 
- 10 Bjarklev, A.  
Hybrid erbium-doped fiber for gain flattened operation  
(1997) *Optical Fiber Technology*, 3 (1), pp. 72-76.  
doi: 10.1006/ofte.1997.0202  
[View at Publisher](#)
- 
- 11 Sulaiman, W.H., Harith, A.  
Gain clamped two-stage double-pass L-band EDFA with a single fibre Bragg grating  
(2004) *Chinese Physics Letters*, 21 (10), pp. 1954-1957. Cited 3 times.  
doi: 10.1088/0256-307X/21/10/025  
[View at Publisher](#)
- 
- 12 Bigot, L., Le Cocq, G., Quiquempois, Y.  
Few-mode erbium-doped fiber amplifiers: A review  
(2015) *Journal of Lightwave Technology*, 33 (3), art. no. 6983523, pp. 588-596. Cited 15 times.  
doi: 10.1109/JLT.2014.2376975  
[View at Publisher](#)
- 
- 13 Cheng, X.S., Parvizi, R., Ahmad, H., Harun, S.W.  
Wide-band bismuth-based erbium-doped fiber amplifier with a flat-gain characteristic  
(2009) *IEEE Photonics Journal*, 1 (5), art. no. 5345732, pp. 259-264. Cited 28 times.  
doi: 10.1109/JPHOT.2009.2037725  
[View at Publisher](#)
- 
- 14 Schermer, R., Berglund, W., Ford, C., Ramberg, R., Gopinath, A.  
Optical amplification at 1534 nm in erbium-doped zirconia waveguides  
(2003) *IEEE Journal of Quantum Electronics*, 39 (1), pp. 154-159. Cited 26 times.  
doi: 10.1109/JQE.2002.806163  
[View at Publisher](#)
- 
- 15 Ahmad, H., Thambiratnam, K., Paul, M.C., Zulkifli, A.Z., Ghani, Z.A., Harun, S.W.  
Fabrication and application of zirconia-erbium doped fibers  
(2012) *Optical Materials Express*, 2 (12), pp. 1690-1701. Cited 10 times.  
[http://www.opticsinfobase.org/DirectPDFAccess/96469CFB-92FE-A5C3-4CA7DCFE95139850\\_244828/ome-2-12-1690.pdf?da=1&id=244828&seq=0&mobile=no](http://www.opticsinfobase.org/DirectPDFAccess/96469CFB-92FE-A5C3-4CA7DCFE95139850_244828/ome-2-12-1690.pdf?da=1&id=244828&seq=0&mobile=no)  
doi: 10.1364/OME.2.001690  
[View at Publisher](#)

🔍 Hamida, B.A.; Department Electrical and Computer Engineering, International Islamic University Malaysia, Malaysia; email:belal@iiu.edu.my

© Copyright 2016 Elsevier B.V., All rights reserved.

## About Scopus

[What is Scopus](#)  
[Content coverage](#)  
[Scopus blog](#)  
[Scopus API](#)  
[Privacy matters](#)

## Language

[日本語に切り替える](#)  
[切换到简体中文](#)  
[切换到繁體中文](#)  
[Русский язык](#)

## Customer Service

[Help](#)  
[Contact us](#)

---

**ELSEVIER**

[Terms and conditions](#) [Privacy policy](#)

Copyright © 2017 Elsevier B.V. All rights reserved. Scopus® is a registered trademark of Elsevier B.V.

Cookies are set by this site. To decline them or learn more, visit our [Cookies page](#).

 RELX Group™