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Continuous Tunable Lasing Characteristics of Blended Polymer System

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Abstract

Most inorganic or organic solid state lasers lase with single wavelength only. However, to produce tunable laser emission across a broad wavelength range, for example, optical range from a single organic system has yet to be realised. Current approach on tunable laser system is using feedback structure design [1], Burstein-Moss effect [2], and bandgap engineering [3, 4]. In this report, we show that BEHP-PPV/MEH-PPV blended polymer system exhibits continuous tunable lasing emission property. Different blending ratio produces a shift in the energy transfer preference of the blended polymer, and therefore the energy transfer rate would change with respect to the blending ratio. These changes create different energy environments for lasing viz different meta-stable lasing environment is created. Our work shown that blended polymer thin film with different blending ratio would emit different lasing wavelength, leading to lasing tunability [Fig. 1]. The understanding on the physics and chemistry of the blended polymer could lead to a new family of blended polymer systems for tunable lasing.

Fig. 1: Figure Shift of ASE peak as function of .

Keywords : Blended polymers, Tunable lasing

References:

- [1] Y. Xiao, C. Meng, P. Wang, Y. Ye, H. Yu, S. Wang, F. Gu, L. Dai, L. Tong, *Nano Lett.*, **2011**, *11*, 1122.
- [2] X. Liu, Q. Zhang, J. N. Yip, Q. Xiong, T. C. Sum, *Nano Lett.*, **2013**, *13*, 5336.
- [3] Y. Liu, J. A. Zapien, Y. Y. Shan, C.-Y. Geng, C. S. Lee, S.-T. Lee, *Adv. Mater.*, **2005**, *17*, 1372.
- [4] A. Pan, W. Zhou, E. S. P. Leong, R. Liu, A. H. Chin, B. Zou, C. Z. Ning, *Nano Lett.*, **2009**, *9*, 784.