

## ELECTRONIC SUPPLEMENTARY INFORMATION

### Improved performance of perylene-diimide-based lasers

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**Fig. S1** ASE wavelength,  $\lambda_{\text{ASE}}$ , (a) and ASE linewidth,  $\text{FWHM}_{\text{ASE}}$ , (b) for PS films doped with different concentrations of PDI-C6 (full squares) and PDI-O (open triangles). The error is ( $\pm 0.4$ ) in the  $\lambda_{\text{ASE}}$  and ( $\pm 0.8$ ) in the  $\text{FWHM}_{\text{ASE}}$ .

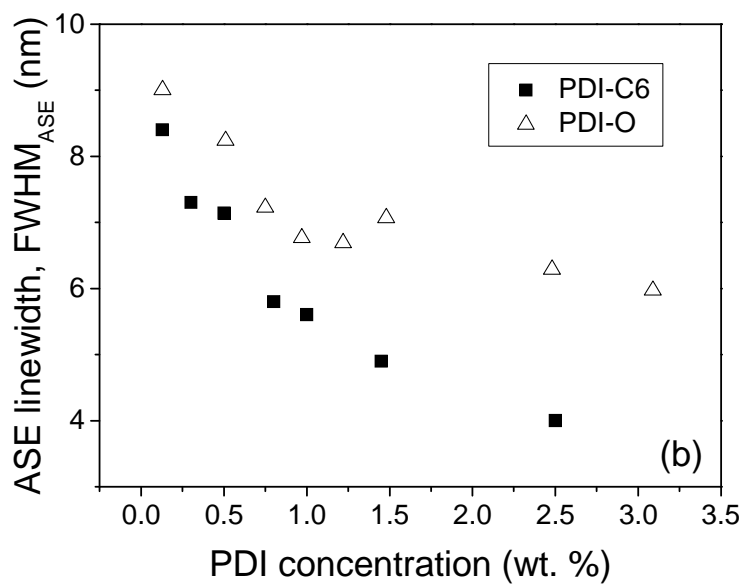
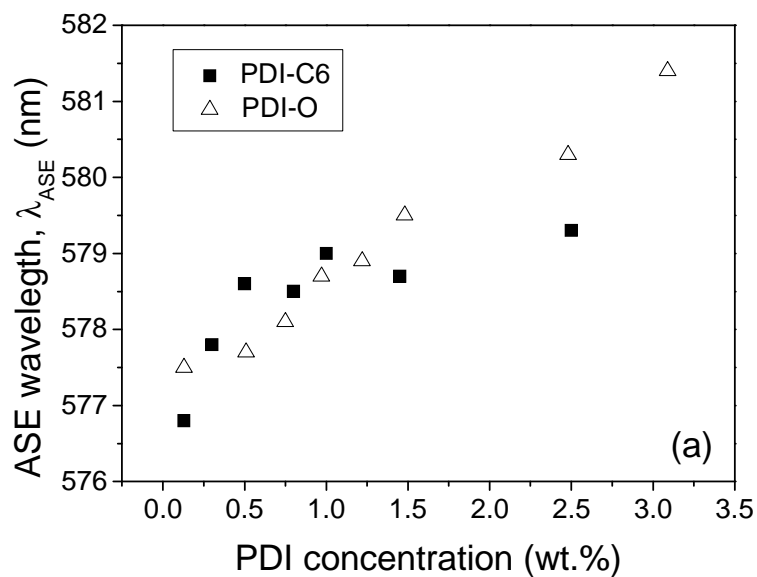
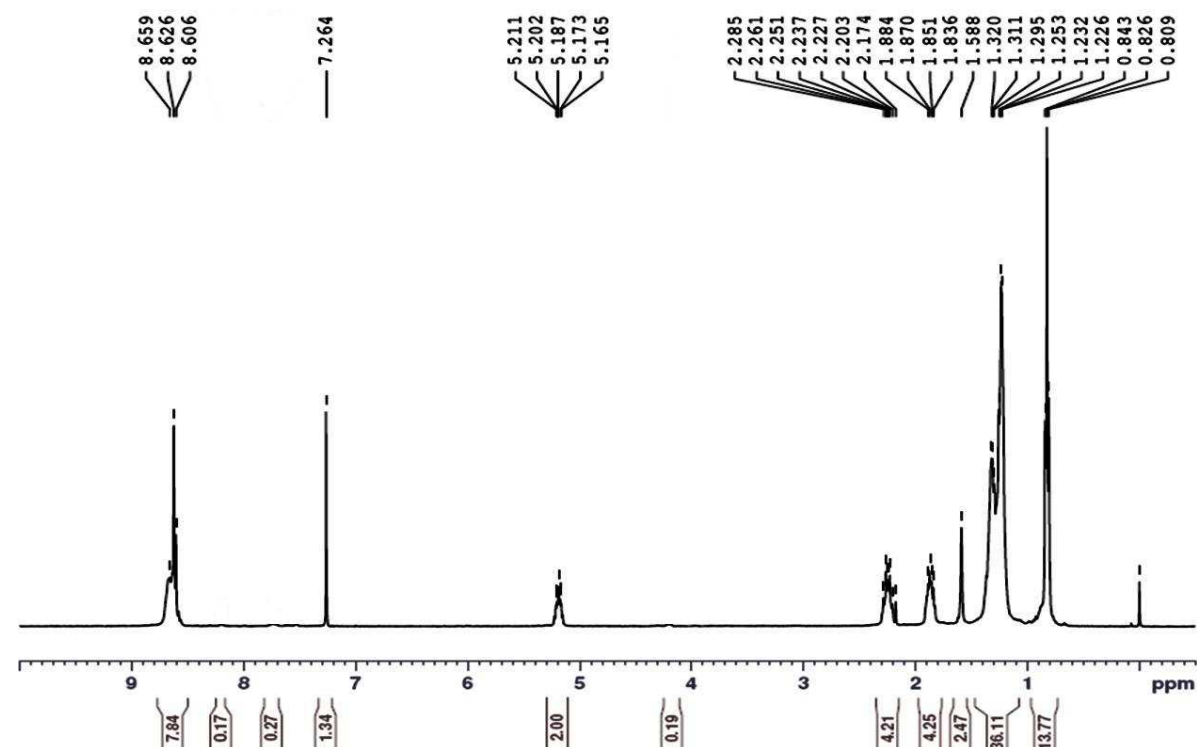
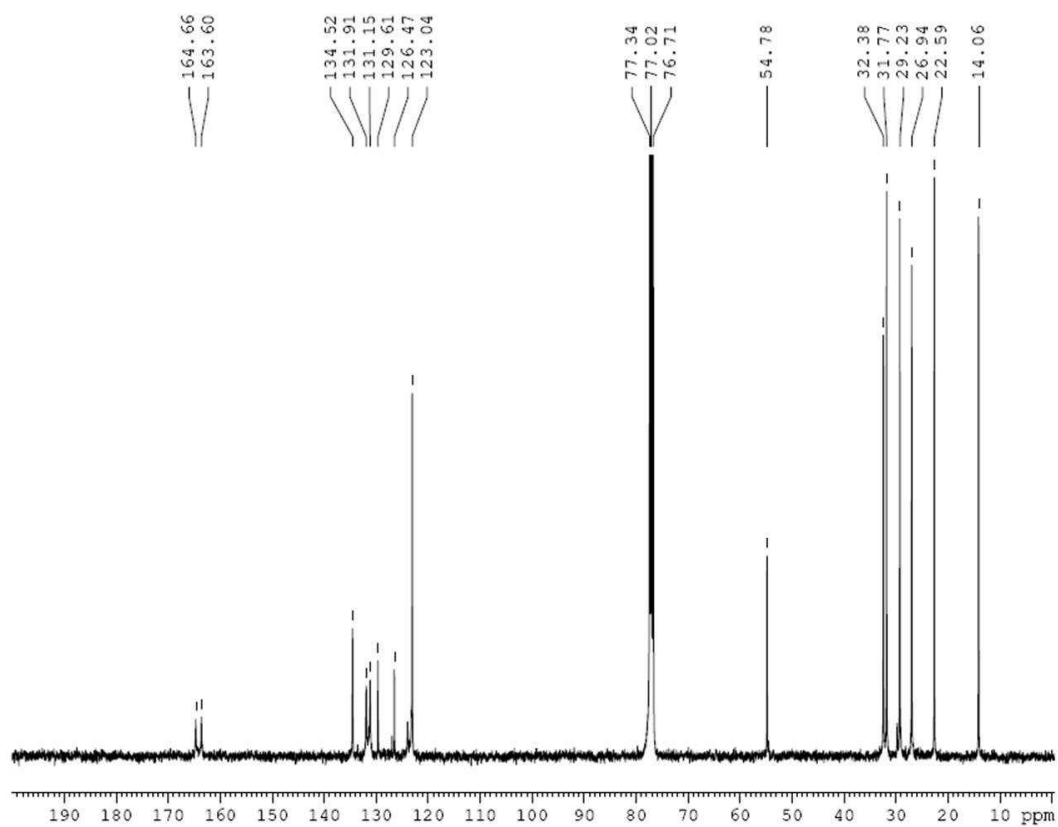


Fig. S2.  $^1\text{H}$  NMR (a) and  $^{13}\text{C}$  NMR (b) spectra of PDI-C6 in solution.

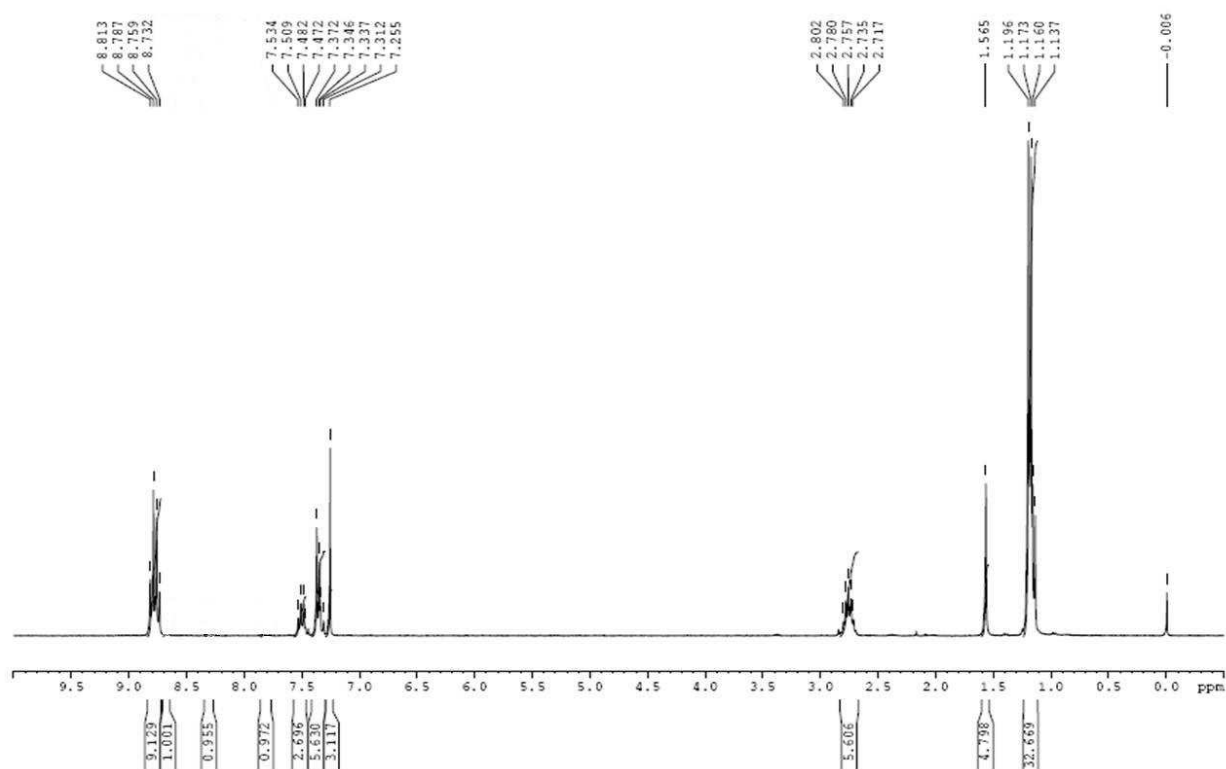


(a)

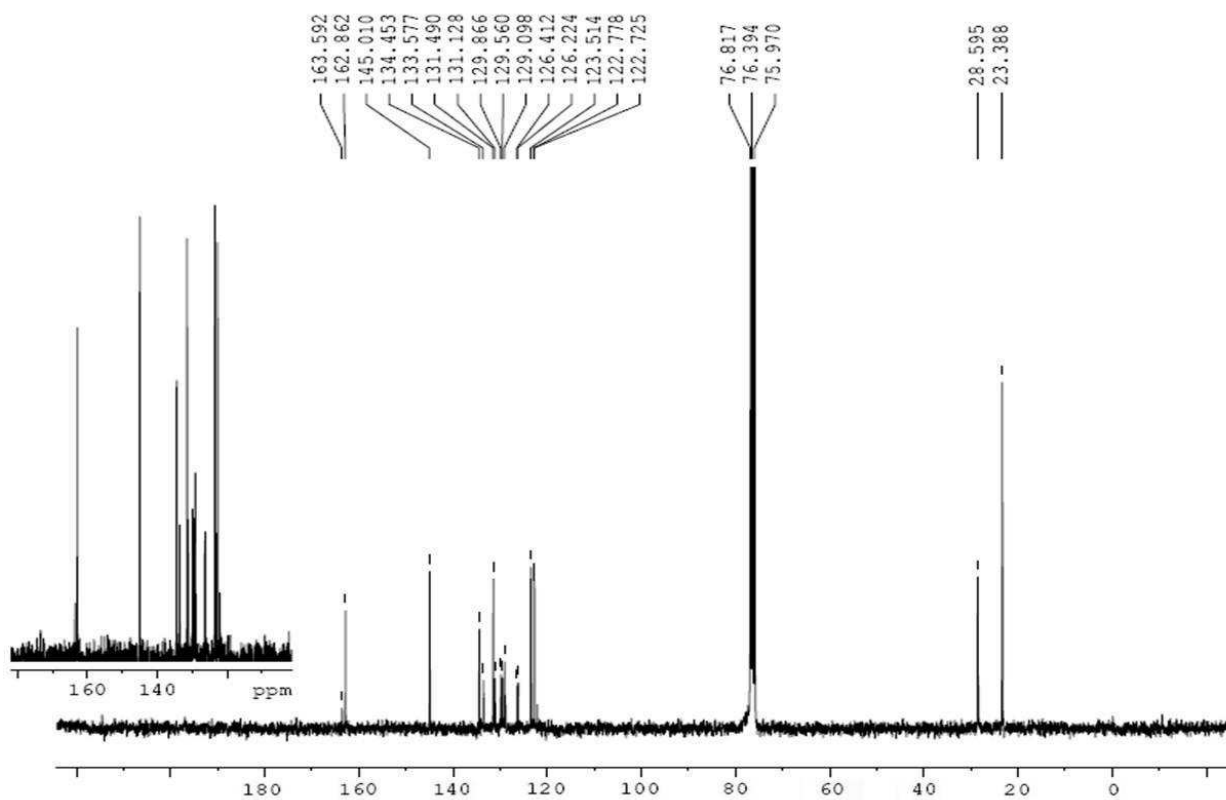


(b)

**Fig. S3.**  $^1\text{H}$  NMR (a) and  $^{13}\text{C}$  NMR (b) spectra of PDI-O in solution.



(a)



(b)