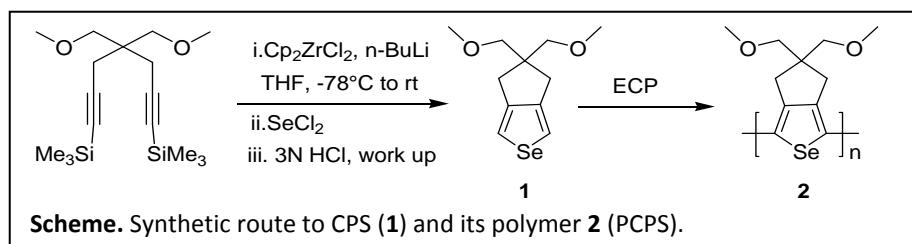


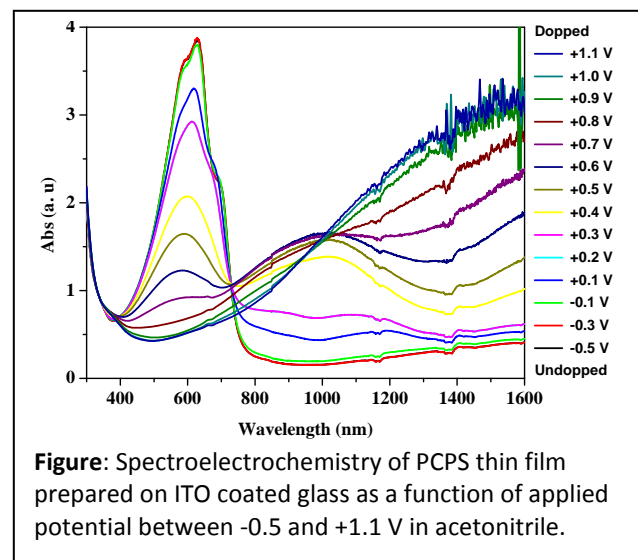
Poly(cyclopenta[c]selenophene): a new polyselenophene

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Designing new conducting polymers¹ is presently a very attractive field of research. Despite the thousands of papers published on polythiophene and its derivatives, very little is known about its close analogue, polyselenophenes.² Here we have developed a new synthetic approach to prepare 3,4-cyclopentene substituted selenophene **1** (CPS). The resulting selenophene **1** was successfully electrochemically polymerized and studied by the



spectroelectrochemistry. 3,4-Substitution is interesting in the aspect that substitution at 3- and 4-positions of selenophene prevents the occurrence of α - β and β - β coupling during electropolymerization,



substitution improves the solubility and also lowers the oxidation potential. In contrast to 3,4-dialkyl substitution, 3,4-cyclopentene substitution does not create any steric congestion and maintain the planarity of the resulting conjugated systems. PCPS (**2**) showed well defined spectroelectrochemistry and low band gap of 1.65 eV and a good stability in oxidized state. The preliminary studies on PCPS promise its future applications as a high performance organic material for photovoltaic and electrochromic devices.

- 1 (a) *Handbook of Thiophene-based Materials: Applications in Organic Electronics and Photonics, Vol. 1* (Eds.: I. F. Perepichka and D. F. Perepichka), John Wiley & Sons, New York, 2009.
- 2 For synthesis and properties of substituted polyselenophenes, see: (a) M. Heeney, W. Zhang, D. J. Crouch, M. L. Chabinye, S. Gordeyev, R. Hamilton, S. J. Higgins, I. McCulloch, P. J. Skabara, D. Sparrowe and S. Tierney, *Chem. Commun.* 2007, 5061–5063. (b) A. Patra, Y. H. Wijsboom, S. S. Zade, M. Li, Y. Sheynin, G. Leitus and M. Bendikov, *J. Am. Chem. Soc.*, 2008, **130**, 6734.