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Phase Separation in PEDOT:Gelatin Composites Revealed by Synchrotron-FTIR-based Grazing Incidence Reflection (S-FTIR GIR)

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Conducting polymers (CPs) have emerged and been subject of an intense research for a new generation of electronic devices due to their high conductivity and a number of promising optical properties that come with their light-weight, high flexibility, and solution-processible properties, making them versatile for a diverse range of applications. In particular, poly(3,4-ethylenedioxythiophene) (PEDOT) and its composites have been widely studied as a potential new material in bioelectronics and tissue engineering due to their good biocompatibility and excellent chemical stability.

In this study, we investigated the molecular interaction and the distribution of gelatin that was incorporated into PEDOT films via vapour phase polymerization at different ratios, using synchrotron-FTIR-based grazing incidence reflection (S-FTIR GIR) technique. While previous cyclic voltammetry studies indicated no change in electrochemical properties of PEDOT in PEDOT:gelatin composites, S-FTIR GIR maps interestingly revealed the increasing degree of phase separation in the composite domains as the ratio of gelatin increased (Fig.1). This is the first time that the phase separation in PEDOT:gelatin composites was observed and proved experimentally.

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Keywords

PEDOT composites, gelatin, phase separation, synchrotron-FTIR, grazing incidence reflection

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