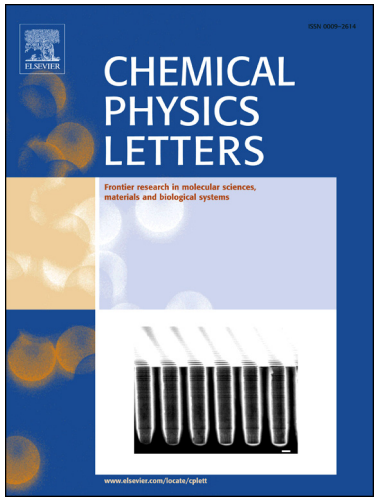

Research paper

Coloration of tyrosine by organic-semiconductor interfacial charge-transfer transitions

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Coloration of tyrosine by organic-semiconductor interfacial charge-transfer transitions

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L-tyrosine (Tyr) plays a crucial role as a proteinogenic amino acid and also as a precursor to several neurotransmitters and hormones. Here we demonstrate coloration of Tyr based on organic-semiconductor interfacial charge-transfer (ICT) transitions. The ICT transitions from Tyr-Me to TiO_2 are induced by the chemisorption of Tyr on TiO_2 surfaces via the hydroxy group. Because other amino acids possess no chemical groups to induce ICT transitions, the ICT transitions provide a selective coloration method for Tyr without drastic structural changes in contrast to the conventional coloration methods.

1. Introduction

L-tyrosine (Tyr) is a proteinogenic amino acid with several bio-functions and also a crucial precursor to various bio-molecules involving neurotransmitters and hormones such as dopamine, as shown in Fig. 1(a). Usually, Tyr is colored by chemical reactions such as nitration by xanthoprotein reactions and diazocoupling by Pauly reactions. [1] In the coloration reactions, however, the molecular structure of Tyr is changed drastically. In order to explore a coloration method of Tyr without drastic structural changes, we have paid our attention to interfacial charge-transfer (ICT) transitions between