[*Chem. Lett.*, **1999**, 983-984] [Lab. of Pharm. Anal. Chemistry]

Bistable Charge-Transfer Complex Formation in the TCNE–Biphenylene System Based on the Intermolecular HOMO–LUMO Interaction in the Neutral and Dianionic Redox States of TCNE.

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It has been demonstrated that the tetracyanoethylene dianion ($TCNE^{2-}$) forms the charge-transfer complex with biphenylene (BP), caused by the favorable intermolecular HOMO–LUMO interaction. The TCNE–BP system involving the bistable charge-transfer (CT) complex formation modulated by redox reactions of TCNE.

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Surface Characterization and On-line Activity Measurements of Microorganisms by Capillary Zone Electrophoresis.

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Capillary zone electrophoresis (CZE) was applied to the electrophoretic characterization for microorganisms. The electrophoretic peaks detected using light scattering phenomena were characteristic of the microorganisms used. The electrophoretic mobility (μ) evaluated by CZE was in good agreement with that obtained by classical electrophoresis of microorganisms. The migration time was responsible and depended on the ionic strength (I). Analysis of the μ vs. I relationship provided information regarding the charge density and the hardness of the microbial cell surface. The redox enzymatic activity of microorganisms was also evaluated by CZE using a running buffer containing a corresponding substrate and an appropriate exogenous electron acceptor. A decrease in the concentration of the electron acceptor due to microbial activity can be simultaneously monitored during the electrophoretic process without significant modification of the CZE equipment. Effects of some chemical treatments of microbial cells were also studied using this technique.

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Enhanced Tumour Accumulation of Doxorubicin with Polymer-coated Liposomes in Rats.

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Doxorubicin-loaded liposomes composed of egg phosphatidylcholine and cholesterol (1: 1 molar ratio) were coated with polyvinylalcohol and hydroxypropylmethylcellulose derivatives (PVA-R and HPMC-R, respectively) and evaluated after intravenous injection in rats bearing Walker rat carcinoma 256 cells. Polymer-coated liposomes exhibited significantly higher drug levels in the blood than uncoated liposomes. The concentration of doxorubicin in solid tumour was evaluated 24 h after injection of polymer-coated liposome and uncoated liposomes. Polymer-coated liposomes showed 2.03 (PVA-R) and 1.94-times (HPMC-R) higher concentrations in the tumour than uncoated liposomes. This difference was still evident 48 h after injection. The results indicate that long-circulating polymer-coated liposomes could enhance the efficiency of anticancer agents by the selective accumulation of drugs at the tumour site.

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Preparation of poly(DL-lactide-co-glycolide) nanoparticles by modified spontaneous emulsification solvent diffusion method.

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The objectives of this study were to establish a new preparation method for poly(DL-lactide-co-glycolide) (PLGA) nanoparticles by modifying the spontaneous emulsification solvent diffusion (SESD) method and to elucidate the mechanism of nanoparticle formation on the basis of the phase separation principle of PLGA and poly(vinyl alcohol) (PVA) in the preparation system. Methods: PLGA nanoparticles were prepared by the modified-SESD method using various solvent systems consisting of two water-miscible organic solvents, in which one solvent has more affinity to PLGA than to PVA and the other has more affinity to PVA than to PLGA. The modified-SESD method provided a good yield of PLGA nanoparticles over a wide range of composition ratios in the binary mixture of organic solvents. The proposed modified-SESD method can be used to provide PLGA nanoparticles of satisfactory quality at an acceptable yield for industrial purposes.