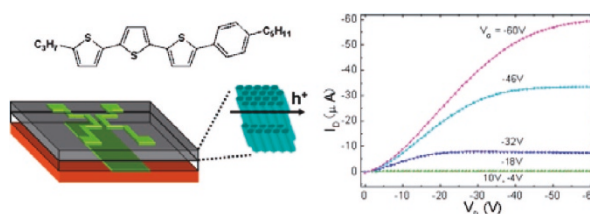


AWARD ACCOUNTS

SPSJ Hitachi Chemical Award Accounts

Development of Liquid-Crystalline Semiconductors with High Carrier Mobilities and Their Application to Thin-film Transistors

Carrier transport in liquid-crystal phases, design of liquid-crystalline semiconductors with high carrier mobilities, and their application to field-effect transistors are reviewed. High carrier mobility has been observed in the smectic phases of oligothiophene derivatives as well as in the columnar phases of triphenylene and hexabenzocoronene derivatives. Asymmetrically substituted liquid-crystalline oligothiophene derivatives are solution-processable and can be used in high-performance field-effect transistors.

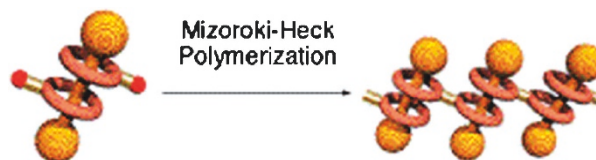


M. FUNAHASHI
Vol. 41, No. 6, pp 459–469 (2009)

REGULAR ARTICLE

Synthesis and Characterization of Poly[3]rotaxane through the Mizoroki-Heck Coupling Polymerization of Divinyl-functionalized [3]Rotaxane

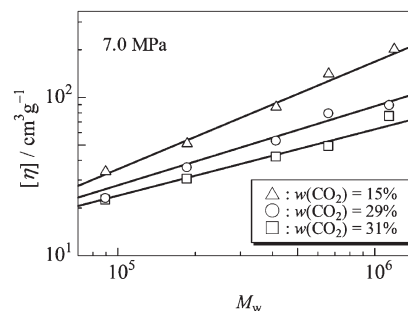
Main chain-type poly[3]rotaxanes were synthesized according to the rotaxation-polymerization protocol by the polymerization of a divinyl [3]rotaxane monomer through the Mizoroki-Heck coupling with a diiodoarene. The mobility of the wheel components in [3]rotaxanes were evaluated by the two-dimension NOESY spectra. The structures of the polyrotaxanes were determined mainly by NMR and GPC, while the IR spectra showed the generated vinylenes were mainly *trans* configuration. The properties of the polyrotaxanes such as solubility and thermal stability were evaluated.



T. SATO and T. TAKATA
Vol. 41, No. 6, pp 470–476 (2009)

Intrinsic Viscosity of Polystyrene in Toluene-Supercritical Carbon Dioxide Mixtures

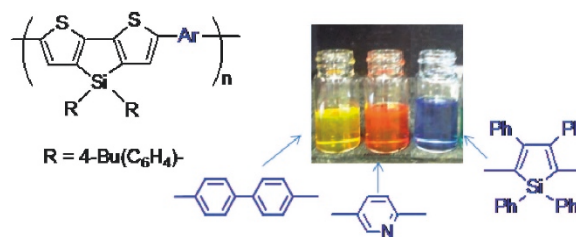
Intrinsic viscosities $[\eta]$ of polystyrene in Toluene + supercritical CO_2 at different weight fraction of CO_2 (denoted by $w(\text{CO}_2)$) and pressure P were determined as functions of weight-average molecular weight M_w . The figure shows that $[\eta]$ for each $w(\text{CO}_2)$ at $P = 7.0 \text{ MPa}$ is expressed by the form $\text{const} \times M_w^a$ and that the exponent a remarkably decreases from 0.68 to 0.42 with increasing $w(\text{CO}_2)$ from 15 to 31%.



M. ONISHI, Y. NAKAMURA, and T. NORISUYE
Vol. 41, No. 6, pp 477–481 (2009)

Synthesis of Alternate Copolymers Composed of Dithienosilole and π -Conjugated Units

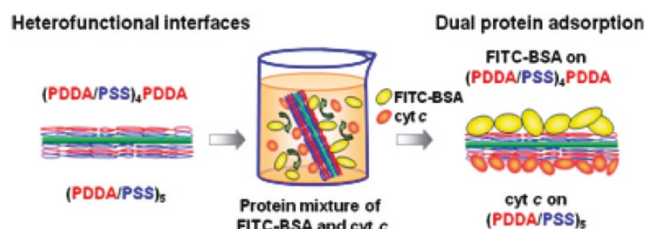
Stille cross-coupling reactions of 2,6-bis(tributylstannyl)-4,4-bis(4-butylphenyl)dithienosilole with dihaloarenes gave dithienosilole-arene alternate polymers. The resulting copolymers showed the UV absorption and emission maxima at 450–601 nm and 543–698 nm, respectively, depending on the arene units in the polymer backbone. Electroluminescence properties of the dithienosilole-pyridine polymer were studied in its spin-coated film.



J. OHSHITA, H. KAI, K. KIMURA,
K.-H. LEE, and A. KUNAI
Vol. 41, No. 6, pp 482–485 (2009)

Heterofunctional Interfaces Achieve Dual Protein Adsorption on Polyelectrolyte Multilayers

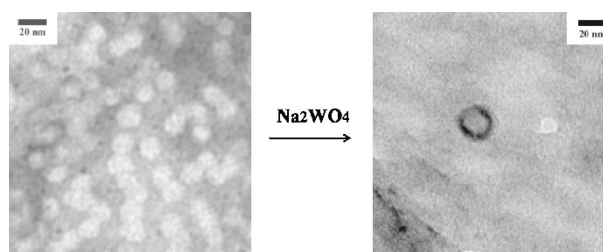
The heterofunctional polyelectrolyte multilayers were prepared by integration of alternate adsorption process and alternate drop coating process. Moreover, in the protein mixture of fluorescein isothiocyanate-labeled bovine serum albumin (FITC-BSA) and cytochrome *c* (cyt *c*) solutions, FITC-BSA and cyt *c* simultaneously adsorbed on the cationic and anionic surface of the heterofunctional interfaces, respectively, without any sequential protein adsorption. Therefore, the heterofunctional interfaces can achieve dual protein adsorption from a protein mixture on both sides of the substrate.



H. Y. SHEN, J. WATANABE, and M. AKASHI
Vol. 41, No. 6, pp 486–491 (2009)

Hybrid Polymeric Micelles Based on Poly(styrene-*b*-2-vinyl-1-methylpyridinium iodide-*b*-ethylene oxide) and Tungstate

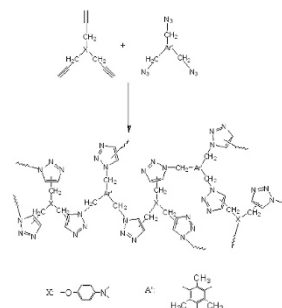
Poly(styrene-*b*-2-vinyl-1-methylpyridinium iodide-*b*-ethylene oxide) (PS-PVMP-PEO) was synthesized by quaternizing poly(styrene-*b*-2-vinyl pyridine-*b*-ethylene oxide) with iodomethane. PS-PVMP-PEO/tungstate hybrid micelles were prepared by binding tungstate to the PVMP block at neutral pH in aqueous solutions. It was found that the PS-PVMP-PEO/tungstate hybrid micelles have a spherical structure with a hydrodynamic diameter ranging from 80 to 120 nm depending on the amount of the incorporated tungstate.



D. LIU, K. NAKASHIMA, Z. TUZAR, and P. STEPANEK
Vol. 41, No. 6, pp 492–497 (2009)

Synthesis and Characterization of a New Polytriazole Resin Derived from *N,N*-Dipropargyl-*p*-propargyloxyaniline

A new polytriazole (PTA) resin was prepared from *N,N*-dipropargyl-*p*-propargyloxyaniline and 1, 3, 5-tris(azidomethyl)-2, 4, 6-trimethyl-benzene. The physical properties, rheological behavior, curing behavior, thermal and mechanical properties of the PTA resin were investigated. The results showed that the PTA resin could cure initially at 70 °C and completely at 200 °C. The cured PTA resin had good heat resistance and high mechanical properties.

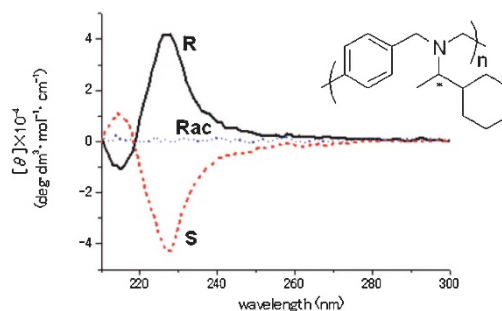


X. WANG, Z. ZHAO, J. TIAN, L. WAN,
Y. HU, F. HUANG, and L. DU
Vol. 41, No. 6, pp 498–502 (2009)

NOTE

Synthesis of Optically Active Polyamines Based on Chiral 1-Cyclohexylethylamine Derivatives

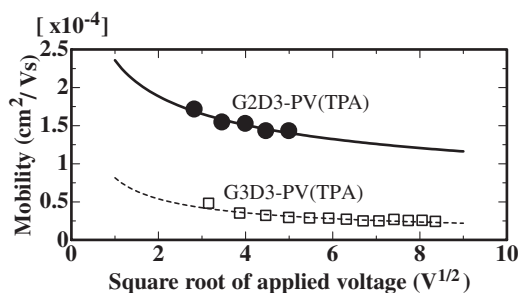
The facile synthesis of a new optically active polyamine by polycondensation of chiral 1-cyclohexylethylamine derivatives with xylylene dibromide in the presence of K_2CO_3 is described. The obtained polymers were well-soluble in common organic solvents and aqueous hydrogen chloride. Inspections of the specific rotation data and circular dichroism (CD) spectra indicate that the polymers may take on some higher-order or regular structures in solution.



A. KOBAYASHI, G. KONISHI, and K. SHIRAKI
Vol. 41, No. 6, pp 503–507 (2009)

Carrier Mobility for π -Conjugated Dendrimer Composed of Phenylene-vinylene Dendron and Triphenylamine Surface Group

The hole mobility for two-generation π -conjugated phenylene-vinylene dendrimer surrounded by triphenylamine surface group evaluated by time of flight method was 10^{-4} $cm^2/(V \cdot s)$ order, which was one order higher than that for three-generation dendrimer. The result indicates that the dendron and surface groups are less restricted for the two-generation dendrimer by decreasing the number of the generation. Therefore, the distance between the π -conjugated dendron sites with different dendrimer is more close to each other.



M. MIZUSAKI, M. YAMAHARA, Y. YAMADA,
S. OBARA, and K. TADA
Vol. 41, No. 6, pp 508–510 (2009)