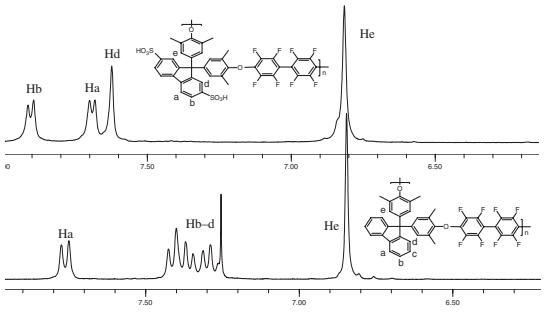
SHORT COMMUNICATION

Synthesis and Characterization of Partially Fluorinated Poly(arylene ether) Containing Sulfofluorenyl Groups for Proton Exchange Membranes

Partially fluorinated poly(arylene ether) containing sulfofluorenyl groups was successfully synthesized. The sulfonation took place only at (2,7)-position on fluorenyl groups. The sulfonated polymer was very soluble in common organic solvents and could be readily cast into tough and smooth membrane. The membrane showed excellent stabilities resistance to both oxidation and hydrolysis. The membrane had higher proton conductivity than Nafion 117, which could be used as proton-exchangeable membrane for fuel-cell.

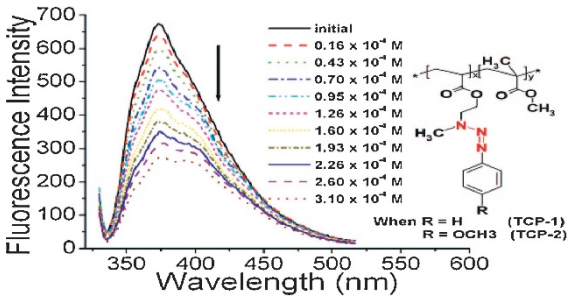


L. WANG and G. ZHU
Vol. 41, No. 9, pp 692–693 (2009)

REGULAR ARTICLE

Fluorescence Properties of Some Triazene Polyacrylates for Possible Sensor Applications

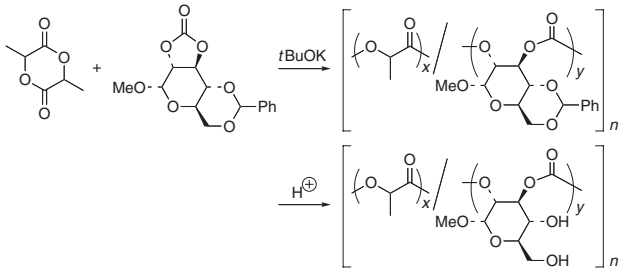
Our approach concerning triazene polyacrylates with focus on their capability to emit fluorescence in DMF solution and thin polymeric films is described in correlation with photodecomposition of the triazene groups induced by UV irradiation. Following the fluorescence response toward the quenching transition metal ions (ex. Fe^{2+}) it was established that apparent Stern-Volmer constants decrease in the order $Fe^{3+} > Fe^{2+} > Cu^{2+} > Cu^{+}$, results that directly reflect the relative sensitivity of the method for the above metal ions.



E. C. BURUIANA, L. STROEA, and T. BURUIANA
Vol. 41, No. 9, pp 694–701 (2009)

Anionic Ring-Opening Copolymerization of L-Lactide with a Five-Membered Cyclic Carbonate Having a Glucopyranoside Structure

The anionic ring-opening copolymerization of L-lactide (LL) with a five-membered cyclic carbonate having the glucopyranoside structure, methyl 4,6-*O*-benzilidene-2,3-*O*-carbonyl-α,D-glucopyranoside (MBCG), was carried out using *t*-BuOK as the initiator and THF as the solvent. The mole fractions of LL in the copolymer of all copolymers were nearly equal to the corresponding mole fraction of LL in the feed (F_{LL}). Deprotection of the copolymer was also examined.

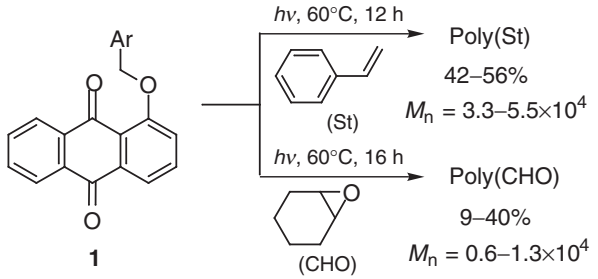


O. HABA, N. FURUICHI, and Y. AKASHIKA
Vol. 41, No. 9, pp 702–708 (2009)

Polymer Journal

1-(Arylmethyloxy)-9,10-anthraquinones: Photoinitiators for Radical and Cationic Polymerizations

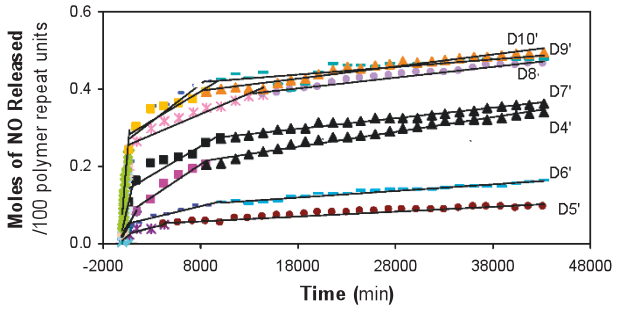
The 1-(methoxy-substituted arylmethyloxy)-9,10-anthraquinone photoinitiators **1a–d** containing no halogen or metal induced radical and cationic polymerization reactions of St and CHO, respectively, to give the corresponding polymers in reasonable yields. Analysis of the photoproducts derived from each initiator as well as of the polymer end groups substantiated that the arylmethyloxyl radical and arylmethyl carbocation are the major reactive species initiating the polymerization of St and CHO, respectively.



M. TOZUKA, T. IGARASHI, and T. SAKURAI
Vol. 41, No. 9, pp 709–714 (2009)

Preparation and Properties of Polyamines: Part II–Controlled and Sustained Release of Nitric Oxide (NO) from Nitrosated Polymers

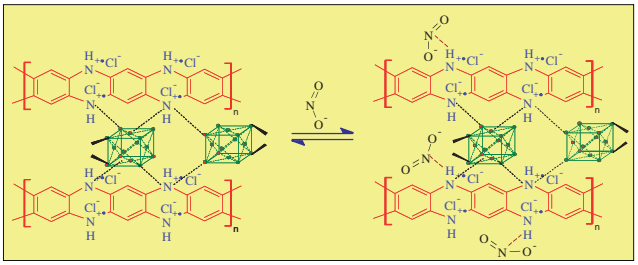
Model compounds and high molecular weight polymers prepared from the reactions of 1,5-difluoro-2,4-dinitrobenzene and aliphatic amines and diamines respectively were nitrosated to yield low molecular weight and polymeric nitrosamines. The polymers and the low molecular weight compounds release nitric oxide in a controlled and sustained fashion with apparent half-lives up to 88 h and 81 h respectively.



J. WANG, Y.-H. TENG, Y. HAO, J. OH-LEE, and D. K. MOHANTY
Vol. 41, No. 9, pp 715–725 (2009)

Vacuum-Deposited Poly(*o*-phenylenediamine)/WO_3·nH_2O Nanocomposite Thin Film for NO_2 Gas Sensor

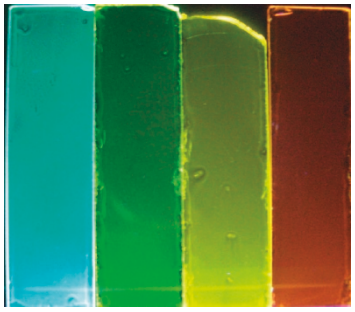
The vacuum-deposited thin film of WO_3·nH_2O embedded poly(*o*-phenylenediamine) nanocomposite was fabricated on an indium tin oxide coated glass surface for potential NO_2 gas sensor application. The composite thin film exhibited a crystalline surface morphology containing nanocrystalls of WO_3·nH_2O with a diameter ranging from 5 to 10 nm. The resulting sensor allowed for the low potential detection of NO_2 gas at concentration range from 0 to 1800 ppm with a relatively fast response (~9 s) and recovery (~10 s) time.



A. TIWARI and S. LI
Vol. 41, No. 9, pp 726–732 (2009)

Synthesis and Light-Emitting Behavior of Silicon-Bridged Fluorene Copolymers Bearing Oligoarylene-vinylene Chromophore

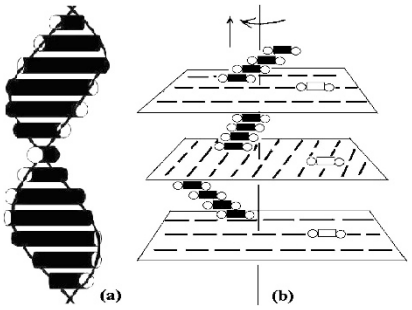
Four types of copolymers with various combination of energy donor/acceptor segments were prepared and optical properties in solution and film states were investigated in order to confirm the fluorescence energy transfer. As a result, the fluorescence emission from energy-accepting oligoarylenevinylene chromophore having longer effective conjugation length than energy-donating terfluorene was observed through intra- and inter-polymer chain energy transfer.



K. TAKAGI, A. TAHARA, and H. KAKIUCHI
Vol. 41, No. 9, pp 733–738 (2009)

Induced Circular Dichroism of Anionic Porphyrin TPPS Aggregates in DNA Solutions

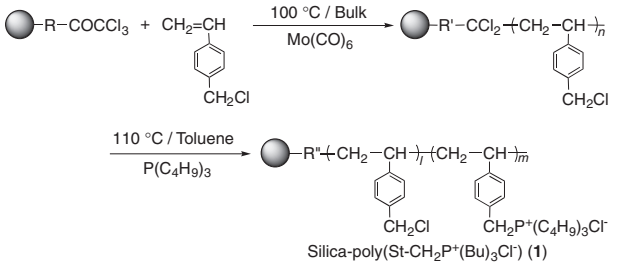
Induced CD signals of TPPS aggregates in both cholesteric liquid crystal and isotropic DNA solutions are all observed within an appropriate pH range. The splitting CD signals of TPPS aggregates in the isotropic DNA solutions should result from the helical arrangement of TPPS molecules within the TPPS aggregates. The induced CD signals without splitting in the cholesteric liquid crystal DNA solutions, which should result from the helical arrangement of the aggregates like molecule screwing along the cholesteric helix axis.



B. LIAO, B. HE, R. LIU, and Y. HUANG
Vol. 41, No. 9, pp 739–743 (2009)

Preparation of Antibacterial Polymer-Grafted Silica Nanoparticle and Surface Properties of Composites Filled with the Silica (2)

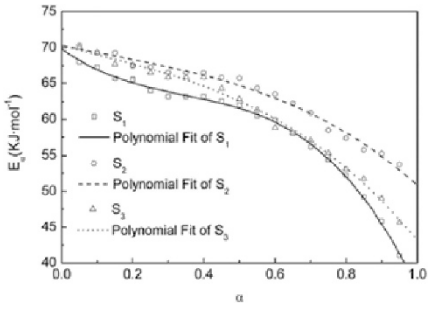
The grafting of antibacterial polymer, poly(vinylbenzyltributylphosphonium chloride) (poly(St-$CH_2P^+(Bu)_3Cl^-$)), onto silica nanoparticle surface, was achieved by two methods: one is treatment of poly(vinylbenzylchloride) (poly(St-CH_2Cl))-grafted silica with tributylphosphine and the other is direct grafting of poly(St-$CH_2P^+(Bu)_3Cl^-$) by radical graft polymerization of the corresponding monomer. The silicone rubber, polystyrene film, and paints filled with the poly(St-$CH_2P^+(Bu)_3Cl^-$)-grafted silica show strong antibacterial activity. These composites retained the antibacterial activity even after the boiling in water for 24 h.



T. KAWAHARA, Y. TAKEUCHI, G. WEI, K. SHIRAI, T. YAMAUCHI, and N. TSUBOKAWA
Vol. 41, No. 9, pp 744–751 (2009)

Fabrication, Morphology and Cure Behavior of Triethylenetetramine-Grafted Multiwalled Carbon Nanotube/Epoxy Nanocomposites

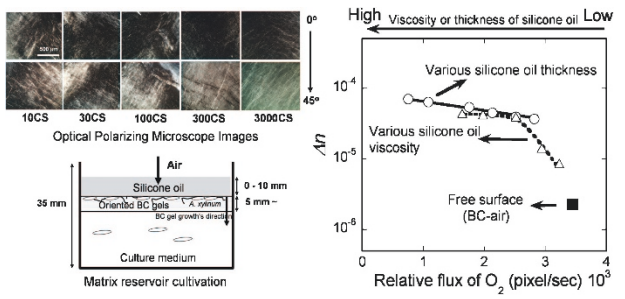
The filling of unmodified and chemically modified MWCNTs does not change the cure reaction mechanism of epoxy, while MWCNTs delay the cure reaction because of their steric hindrance. TETA functional groups on the chemically functionalized MWCNT surface can act as curing agents and facilitate the primary amine-epoxide reaction, which means that they weaken the retardation effect caused by MWCNTs on the cure reaction of epoxy.



K. YANG and M. GU
Vol. 41, No. 9, pp 752–763 (2009)

Orientated Bacterial Cellulose Culture Controlled by Liquid Substrate of Silicone Oil with Different Viscosity and Thickness

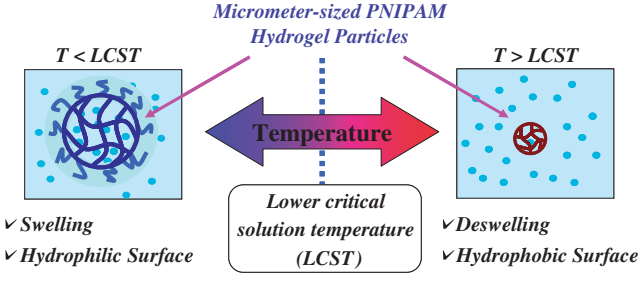
The effect of oxygen and culture interface on the orientation of BC fibril has been investigated by culturing BC on silicone oil with different thickness and viscosity. It was found that viscoelasticity of silicone oil plays an important role to determine the orientation of BC fibrils. Meanwhile, oxygen did not show any significant influence on it. Further, we also found that the thickness and viscosity of silicone oil affected the fibril width, swelling degree, and tensile performance of the BC.



A. PUTRA, A. KAKUGO, H. FURUKAWA, and J. P. GONG
Vol. 41, No. 9, pp 764–770 (2009)

Preparation and Characterization of Micrometer-Sized Poly(*N*-isopropylacrylamide) Hydrogel Particles

Aqueous precipitation polymerization of *N*-isopropylacrylamide (NIPAM) with *N*,*N*′-methylenebisacryamide was performed by varying electrolyte concentrations in the polymerization media. Sodium chloride was used as an electrolyte. Higher electrolyte concentrations provided the production of micrometer-sized PNIPAM particles with a higher swelling capacity compared to conventional nanometer-sized PNIPAM particles. This would be because larger PNIPAM particles are the assemblies of nanometer-sized smaller particles linked each other through weak noncovalent forces.

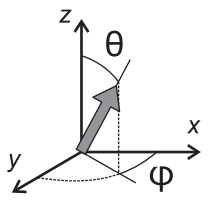


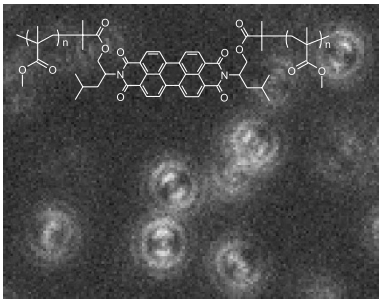
H. SHIMIZU, R. WADA, and M. OKABE
Vol. 41, No. 9, pp 771–777 (2009)

Polymer Journal

Poly(methacrylate)s Labeled by Perylene Diimide: Synthesis and Applications in Single Chain Detection Studies

Poly(methacrylate)s labeled with perylene diimide (PDI) derivatives were synthesized. The dye moiety was selectively introduced by appropriate molecular design at (1) the chain end, (2) the center segment of the main chain, and (3) the whole chain contour. The bright fluorescence from PDI allows the direct observation of the single polymer chain with a high signal-to-noise ratio. The three-dimensional orientation of the chain segment and the conformation of the polymer chains were successfully observed at the single molecule level.





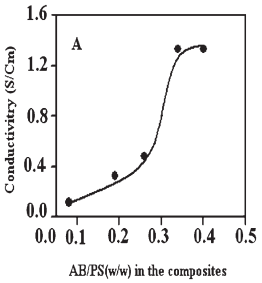
Orientation dependent emission pattern from the PDI molecule at the single polymer chain.

H. AOKI, T. TAKAHASHI, Y. TAMAI, R. SEKINE, S. AOKI, K. TANI, and S. ITO
Vol. 41, No. 9, pp 778–783 (2009)

NOTE

A Conducting Nanocomposite of Polystyrene with Acetylene Black

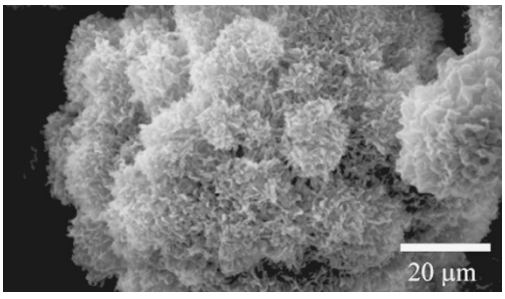
A highly conducting nanocomposite (PS-AB) of polystyrene (PS) with acetylene black (AB) was prepared by aqueous redox polymerization of the monomer in presence of suspended AB nanoparticles. The dC conductivity of PS-AB composite depended on AB:PS weight ratio in the composites.



P. SAHA SARDAR, A. MAITY, S. GHOSH, and M. BISWAS
Vol. 41, No. 9, pp 784–786 (2009)

Formation of Porous Spherulites of Poly(L-lactide) Grown from Solutions

Poly(L-lacide) (PLLA) was crystallized from 5.0 wt % solutions of diethyl phthalate (DEP), glycerol tri-*n*-propionate (TP), *N*,*N*-dimethylformamide (DMF), and dimethyl sulfoxide (DMSO). From DEP and TP solutions, very porous flower-like spherulites consisting of assembled petals are formed, and each petal may include stacked lamellae. From DMF and DMSO solutions, on the other hand, less porous crystalline aggregates are formed, but they can be converted to crystallites with porous surface by etching treatment.

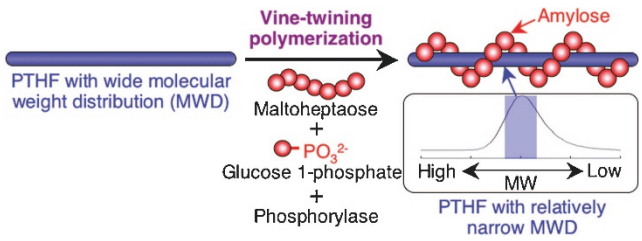


T. SASAKI, R. ASAKAWA, and K. SAKURAI
Vol. 41, No. 9, pp 787–791 (2009)

Polymer Journal

Amylose Selectively Includes a Specific Range of Molecular Weights in Poly(tetrahydrofuran)s in Vine-Twining Polymerization

Amylose selectively included a specific range of molecular weights (MWs) in guest poly(tetrahydrofuran) (PTHF) in "vine-twining polymerization." When the phosphorylase-catalyzed enzymatic polymerization of α-D-glucose 1-phosphate from maltoheptaose as a primer was performed in the presence of PTHFs with different average MWs, amylose included almost same MW range with low distribution in any PTHFs used.



Y. KANEKO, K. BEPPU, and J. KADOKAWA
Vol. 41, No. 9, pp 792–796 (2009)