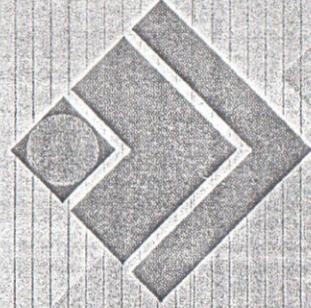


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Poster 149

THE INFLUENCE OF MOLECULAR WEIGHT ON THE PROPERTIES OF ULTRA HIGH MOLECULAR WEIGHT POLYETHYLENE

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Ultra high molecular weight polyethylene is a high performance polymer possessing excellent properties, such as high abrasion resistance, low coefficient of friction, good chemical and stress crack resistance and exceptional resistance at cryogenic temperature. The molecular weight is an extremely important parameter on the study of UHMW-PE, since it affects properties like viscosity, crystallinity, molecular orientation and other physical and mechanical properties. In this work, some methods to study the influence of the molecular weight on the properties of the UHMW-PE, such as X ray diffraction, thermal analyses, SEM and TEM will be presented.

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DEPOSITION OF THIN POLYETHYLENE LAYER ON THE INTERNAL SURFACE OF UHMWPE MEMBRANES

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Polyolefins, the most abundant and low cost polymers, in the manufacture of porous polymer membranes is very attractive. The use of layer deposition isn't common to prepare polymeric membrane, but UHMWPE membrane presents large pore size, about 15,45 μm and its reduction is necessary for to increase its selectivity. The aim of this work, was to investigate the effect of thin polyethylene layer deposition on the surface of porous UHMWPE (ultra high molecular weight polyethylene). The HDPE solution was prepared in concentration of 1,032 g/L of HDPE dissolved in toluene in the temperature of 106 °C. The solution remained 10 s in the interior of the membrane, after this time the solution flowed off and the membrane was placed to dry in ambient temperature for 48 h. The thin polyethylene layer deposition on the surface of the membranes were characterized by water flow permeation and SEM, using a Shimadzu Superscan SSX-550. The results evince that there was a homogeneous deposition on membrane surface causing a reduction in pore size and consequently a flow reduction and better selectivity.

Poster 151

PHOTOLUMINESCENCE PROPERTIES OF SEVERAL PHENYL-BASED CONJUGATED COPOLYMERS

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A series of new phenyl-based conjugated copolymers has been synthesized and investigated by optical spectroscopies. The materials are: poly(9,9-dioctylfluorene)-co-quaterphenylene (1), poly(1,4-phenylene-alt-3,6-pyridazine) (2), poly[(1,4-phenylene-alt-3,6-pyridazine)-co-(1,4-phenylene-alt-9,9-dioctylfluorene)] (3). These copolymers present blue structured photoluminescence (PL) under steady-state excitation at 300 nm. The emission is centered at 440 nm for 1, and at 380 nm for 2 and 3, respectively. However, the quantum yield of 2 is very weak compared to that of the other compounds, and PL appears strongly quenched. Time-resolved PL experiments with excitation at 400 nm using a femtosecond laser reveal that the emission lifetimes lie in the subnanosecond range with very different kinetics for the three compounds. In particular, 3 exhibits two PL regimes with an ultrashort-lived emission component located around 630 nm and a long-lived one at about 500 nm. Infrared and Raman vibrational spectra have also been recorded in order to help in the identification of the emitting species.

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USING POLYELECTROLYTE NANOSTRUCTURED FILMS AS PLATFORM FOR SURFACE ENHANCED SPECTROSCOPY

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In this work, Surface Enhanced Spectroscopy (SES) substrates constructed by layer-by layer technique (LBL) were prepared for selective detection of charged ionic molecules. The approach employed to enhance the selectivity was the production of nanolayered structures composed of different polyelectrolytes on top of LBL films made of silver nanoparticles and dendrimer. Employing polyelectrolyte layers it was possible to enhance the fluorescence or Raman scattering and even be able to selectively detect positive and negative analyte depending upon the architectures of the top layers, with is possible with the absence of the polymeric materials

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EVALUATION OF ELECTRICAL RESPONSE OF POLY-ANILINES IN THE EMERALDINE OXIDATION STATE AS ACTIVE LAYER TO DISPOSABLE SENSOR.

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A disposable electronic nose was used to evaluate the difference in electrical response of the poly-anilines (conductive polymers (polyaniline) and oligomer (phenyl-NH₂ end capped tetraniline (PhECT))) both doped with dodecylbenzenesulfonic acid (HDBSA) and hexafluoro – 2 – propanol (HFIP) as solvent to detected vapor of toluene using the line patterning of graphite to developed interdigitated electrodes atop overhead transparency (poly(ethylene terephthalate) (PET)). In the same concentration of toluene vapor (5000 ppm) the sensibility ($\Delta R\%$) of the two sensors were quite different. The $\Delta R\%$ of the conducting oligomer response = 7.4 times than polymer (PANI) at the same concentration. The ¹H NMR of the PhECT was used to check the synthesis.

Poster 154

INFLUENCE OF PLASTICIZER AND RELATIVE HUMIDITY IN THE HPMC FILM PROPERTIES

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In this study the influence of plasticizers and relative humidity in films based on hydroxypropylmethylcellulose (HPMC) was analyzed. The films were prepared in a total concentration of 2% (w/v), with a percentage of plasticizer (glycerol and sorbitol) of 10 - 30% (w/w). Changes in mechanical and water uptake properties were investigated at a relative humidity of 43, 75 and 98%. The mechanical analysis suggested that the properties were improved when glycerol was used as the plasticizer promoting a decrease in the Young's Modulus, increasing the elongation and decreasing the tensile strength. With increasing relative humidity it was observed that the water acts as a plasticizer too, increasing the elongation of the films. For the films with the plasticizers, there was an increase in the water uptake in the films with an increase in the plasticizer percentage and relative humidity, being this increasing more effective when the glycerol was added.

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BIODEGRADABLE BLENDS BASED ON OLIGOURETHANE AND CHITIN: A MORPHOLOGICAL STUDY.

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The addition of a biodegradable oligourethane (PU), based on polycaprolactone (PCL) to chitin (Chn) was explored in an attempt to provide better processability and flexibility to the natural polymer. The ratio PU/Chitin was systematically varied and the morphological characteristics, thermal and mechanical behavior were investigated using GPC, DSC, DMTA, SEM and tensile measurements.

Poster 156

REMOVAL OF LEAD AND CUPPER FROM WATER USING A SUPERABSORBENT HYDROGEL

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The aim of this work is to study the removal percentage of Pb²⁺ and Cu²⁺ from water using a superabsorbent hydrogel. The SH was obtained from an anionic polysaccharide co-polymerized with acrylic acid (AAc) and acrylamide (AAm). Because the functional ionic groups (-COOH) present either in the AAc or Arabic gum (AG) segments, this SH supported pH-sensitivity for absorption of both metals from solution. Taking into account the pH 5.0, it was observed that the SH exhibited a removal capacity for Pb²⁺ and Cu²⁺ in water of 73.10 and 81.99% respectively. On the other hand, the removal capacities for Pb²⁺ and Cu²⁺ in saline water of 0.1 mol.kg⁻¹ ionic strength were 63.64% and 76.67 % respectively. Nevertheless, using a replicated 22 full factorial design, it was found that the interaction and main effects of the pH and the initial concentration of metal solution on removal percentage were statistically significant. Surface response plots indicated that the removal capacity of both metals into the SH may be improved by using the solutions with low initial concentration and with increasing pH-values.