OMICS International
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J Material Sci Eng 2016, 5:2 (Suppl)
http://dx.doi.org/10.4172/2169-0022.C1.012

International Conference and Exhibition on

Materials Chemistry

March 31-April 01, 2016 Valencia, Spain

Evaluation of nanocomposites usage for efficiency enhancement in active layer organic light emitting diodes

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Since years, conjugated polymers have received attention as low cost materials in active layer light emitting diodes but low efficiency of these materials made it a problem which should be considered. Recently, metal nanoparticles are used in display device's active layer to increase the efficiency of materials. Metal nanoparticles enhance coupling between the Localized Surface Plasmon Resonance (LSPR) and exaction in emitting material. In this work, we use SILVACO and MATLAB simulators to examine silver nanoparticles. With the control of Surface Plasmon (SP) and the emission wavelength we can find the best absorbance peak location which maximized photoluminescence (PL) intensity, depending on various Ag, Au and Al dot condition. These metal nanoparticles are used in Solar cells and Polymer LEDs for maximizing the coupling between the LSPR.

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Influence of the pyrolysis temperature on activated carbon properties and CO2 adsorption

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Activated Carbons (ACs) are one of the most promising sorbets. Their properties are widely depending on source material. It allows obtaining ACs with high surface area and well developed porous structure. The pyrolysis temperature influence on specific surface area, micropore volume and CO_2 adsorption was investigated in this study. The ACs was obtained by technology patented by our team. Liquid molasses was mixed with dry KOH in dry mass ratio 1:1. The mixture was dried at 200°C and then it was grounded, pyrolyzed (at 650-850 °C, 1 hour, nitrogen atmosphere) and grounded again. Obtained powder was washed with deionized water, soaked in HCl (5 mol/dm^3) and washed again, till filtrate was neutral. Adsorption and desorption of nitrogen at -196oC was provided with Quantochrome apparatus, so as CO_2 adsorption at 25°C. Specific surface area was calculated using BET equation (SBET), micropore volume was calculated using DFT method. The highest SBET was obtained in AC pyrolyzed at 800°C (2480 m^2/g). Micropore volume percentage in total pore volume was calculated. The highest value (72.5%) was obtained in the case of AC pyrolyzed at 700°C. Micropore volume of AC pyrolyzed at 700°C was 0.609 cm^3/g. CO_2 adsorption value ranged 1.62-3.39 mmol/g. Those properties confirmed that molasses based ACs are potentially very promising sorbents of CO_2.

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