

A white light emitting diode made of ZnO nanorods and a blue LED

SachindraNath Sarangi^{1,2}, Shinji Nozaki¹, SurendraNath Sahu³, Noriyuki Sugiyama¹ and Kazuo Uchida¹

¹The University of Electro-Communications, Japan

²Institute of Physics, SachivalayaMarg, India

³National Institute of Science & Technology, Odisha, India

The white light-emitting diodes (LEDs) have drawn much attention to replace conventional lighting sources because of low energy consumption, high light efficiency and long lifetime. Although the most common approach to produce white light is to combine a blue LED chip and a yellow phosphor, such a white LED cannot be used for a general lighting application, which requires a broad luminescence spectrum in the visible wavelength range. We have successfully chemically synthesized the ZnO nanorods showing intense broad luminescence in the visible wavelength range and made a white LED using the ZnO nanorods as phosphor excited with a blue LED. Their lengths and diameters were 2-10 μm and 200-800 nm, respectively. The wurtzite structure was confirmed by the x-ray diffraction measurement. The PL spectrum obtained by exciting the ZnO nanorods with the He-Cd laser has two peaks, one associated with the near band-edge recombination and the other with recombination via defects. The peak intensity of the near band-edge luminescence at 388 nm is much weaker than that of the defect-related luminescence. The latter luminescence peak ranges from 450 to 850 nm and broad enough to be used as a phosphor for a white LED. A white LED has been fabricated using a blue LED with 450 nm emission and 1.0 mg of ZnO nanorod powders. The LED performances show a white light and the Commission Internationale de l'Eclairage (CIE) chromaticity color coordinates of 450 nm. LED pumped white emission shows a coordinate of (0.30, 0.36) for an optimum composition.

Biography

SachindraNath Sarangi completed his Ph.D. from Jadavpur University, Kolkata in the year 2007 and pursuing his postdoctoral studies at the University of Electro-Communications, Tokyo under JSPS fellowship program. Prior to this postdoc position, he was a scientific officer at Institute of Physics, Bhubaneswar, India. His research interests focus on nanostructured materials for different applications. He has published more than 56 papers in reputed journals and has been serving as reviewer for many international journals.

sachin.sarangi9@gmail.com

Steel corrosion inhibition by *Saccocalyx satureioides* (Lamiaceae) extract in hydrochloric acid

Salah Akkal¹, I. Selatnia², N. Djeddi² and M. Benahmed²

¹University of Constantine, Algeria

²University of Tebessa, Algeria

Many metals and alloys are used in different human activities. Among these, C-steel is one of the most important alloys which are frequently used in wide industrial applications. Corrosion problems arise as a result of interaction of the aqueous solutions with C-steel, especially during the picking process in which the alloy is brought to contact with high concentrated acids. This process can lead to a high economic loss due to the corrosion of the alloy. For this reason, the addition of inhibitors to prevent the corrosion of the steel is very important.

The ethylacetate extract of the aerial parts of *Saccocalyx satureioides* (Lamiaceae) is tested as corrosion inhibitor of X52 steel in 1.0 M HCl solution using weight loss measurement, electrochemical impedance spectroscopy (EIS) and potentiodynamic polarization techniques. Potentiodynamic polarization curves indicated that the plants extract behaves as mixed-type inhibitor. The adsorption of inhibitor on C-steel surface was found to follow Langmuir adsorption isotherm. Negative value was calculated for the energy of adsorption indicating the spontaneity of the adsorption process. The inhibiting action increases with increasing concentration of the extract. The results obtained show that the extract of the aerial parts of *S. satureioides* could serve as an effective inhibitor of the corrosion of C-steel in hydrochloric acid medium.

Biography

Salah Akkal completed his Ph.D. in 2001 from Constantine1 University and scholarships studies from Hannover University in 2004 and 2008. He has published more than 45 papers in reputed journals and is serving as an editorial board member of reputed.

salah4dz@yahoo.fr