Synthesis of nanostructure SBA-15 usingrice husk Ash as silica sources

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Rice husk ash (RHA) which is known to be an environment waste was used as a source of silica to synthesize SBA-15 zeolite, which Si02 can be extracted from rice husk Ash by a suitable alkali solution [1]. SBA-15 is a mesoporous SiO_2 with a hexagonal arrangement of channels with diameters in the range of 2–30 nm. It is expected to be useful in the synthesis of ultrafine, nanorod arrays, protein separations, and highly efficient catalyst even just in its powder form [2-4]. Pure SBA-15 has been prepared by direct synthesis non hydrothermal method, in which the rice husk ash (RHA) is used as silicon source and triblock copolymer (P123) as a structure directing agent and phosphoric acid were used in the synthesis. X-ray fluorescence (XRF) measurements showed that rice husk ash contained more than 90% of amorphous silica and this raw material is suitable for the synthesis of the zeolites. Characterization carried out by powder X-ray diffraction (XRD), infrared (IR) spectroscopy, scanning electron microscopy (SEM), was to evaluate the efficiency of this non hydrothermal method. The diameter of crystal particles was calculated from Deby-Scherrer equation which was approximately 21 nm. The micrographs and XRD of the raw material and products revealed the successful conversion of the amorphous form and XRD of silica to the crystalline form of the zeolites. Thus, rice husk commonly regarded as agro-waste can be used as a source of silica in the form of RHA to produce the highly pure SBA of zeolites.

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Simultaneous Determination of Ascorbic Acid, Dopamine, and Uric Acid by Differential Pulse Voltammetry using Tiron Modified Glassy Carbon Electrode

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A highly selective voltammetric method was developed for the simultaneous determination of ascorbic acid (AA), dopamine (DA), and uric acid (UA) using Tiron polymer film modified on glassy carbon electrode. The modified electrode separated the anodic oxidation peaks potential of AA, DA and UA with a well-defined peak separation in the present of each other to measure AA, DA and UA individually or simultaneously without any intermolecular effect. The calibration curves were obtained over the range of 4.0-792.0 μmol/L AA, 0.2-45.8 μmol/L DA, and 0.06-166.0 μmol/L UA. Detection limits of 1.79 μmol/L AA, 0.07 μmol/L DA, and 0.021 μmol/L UA were obtained at pH 3.0. The interference of potential interfering substances on the determination of AA, DA and UA were studied, and the results confirm the selectivity of the method. The modified electrode was used for the determination of AA, DA, and UA simultaneously in real samples such as drugs, urine, and synthesis samples, with satisfactory results.

Colorimetric detection of $S_2O_4^{2-}$using CTAB functionalized gold nanoparticles

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Sodium dithionite is widely used as a reductant in industry. It finds use as a bleaching agent in the textile and paper industries, in the dyeing of cellulose fibres [1], in the manufacturing of various chemicals, and as a biochemical reductant [2]. Dyeing of cotton fabric with anthraquinone vat dyes like indanthrenes or indigo occurs in an alkaline sodium dithionite solution through a reduction reaction [2]. In the methods reported in the literature, dithionite has been determined by iodimetric [3,4], potentiometric [5], and spectrophotometric [5] titrations, Raman spectroscopy [6], spectrophotometry [2] and ion-chromatography [7]. In the present work, a facile, cost-effective colorimetric detection method for $S_2O_4^{2-}$has been developed by using cetyltribuytylammonium bromide (CTAB) functionalized gold nanoparticles (CTAB-GNPs) in the presence of 1 M NaCl. The sensitivity and selectivity of detection was investigated in detail. The $S_2O_4^{2-}$ could be detected by colorimetric response of GNPs that could be monitored by a UV-vis spectrophotometer or even naked eyes, with detection limit of 0.02mM. The CTAB-GNPs bound by $S_2O_4^{2-}$ showed excellent selectivity compared to other anions($S_2O_3^{2-}$,SO_4^{2-},SO_3^{2-},NO_3^-,NO_2^- ,$C_2O_2H_3^{2-}$,Cl^-,Br^-),which lead to prominent color change. This provided a simple and effective colorimetric sensor for detection of $S_2O_4^{2-}$ without using enzyme or DNA. The proposed method has been successfully applied for the assay of dithionite in water samples.

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Design a novel method for identification and quantitative determination of alkanolamines degradation in amine sweetening units

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Most sour gas processing facilities use chemical absorption using alkanolamines to separate H_2S and CO_2 from the raw gas through chemical absorption using alkanolamines. The prime alkanolamines are monoethanolamine (MEA), diethanolamine (DEA), methyldiethanolamine (MDEA), diisopropanolamine (DIPA), and diglycolamine (DGA). Normally the amine processes are cycles of absorption and desorption in order to permit the use of the absorbent. Due to the closed loop nature of these processes, non-regenerable