عنوان مقاله:

Application of Quartz Crystal Nanobalance for Simultaneous Determination of Vanillylmandelic Acid and Homovanillic Acid by a Net Analyte Signal Based Method

محل انتشار:

دومین کنگره بین المللی علوم و فناوری نانو (سال: 1387)

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خلاصه مقاله:

Urinary homovanillic acid (HVA) and vanillylmandelic acid (VMA) are quantitatively the most important catabolic products of catecholamines. Increased levels of these metabolites in urine clinically may indicate the presence malignant tumors arising from cells of the neural crest such as neuroblastoma and pheochromocytoma [1].Quartz crystal nanobalance (QCN) is a sensing system based on the sorption of analyte on an adsorbent material. The QCN comprises a thin vibrating AT-cut quartz wafer sandwiched between two metal excitation electrodes. When small amounts of mass are adsorbed at the quartz electrode surface, the frequency of the quartz is changed according to the well-known Sauerbrey equation [2]:[]FFAmqqΔ–=Δ202/12)(μρ Eq. (1)where ΔF is the measured frequency shift, Δm the mass change, F0 is the fundamental resonant frequency of the unloaded quartz crystal (10 MHz), A is the electrode area (0.21 cm2), ρq is the density of quartz (2.65 g cm-3) and μq is the shear modulus of quartz (2.95*1011 dyn cm-2). With these constants, we obtain:)(926.0)(HzFngmΔ–=Δ Eq. (2)The major drawback of the some sensors based on QCN is lack of selectivity since other compounds usually interfere along with the analyte. To overcome this shortcoming, considerable interest has been raised on the use of quartz crystals as sensor in conjunction with associated pattern recognition techniques in distinguishing various kinds of compounds [3].In the current investigation the simultaneous determination of VMA and HVA in the solution containing some common urine compounds is described using polymethylmethacrylate (PMM) coated QCN. Net analyte signal (NAS) is utilized to process the frequency data of the crystal at various times, based on different adsorption dynamics of VMA and HVA on the PMM coated QCN

کلمات کلیدی: