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**FUNCTIONALIZED NANOPOROUS TRACK-ETCHED ?-PVDF MEMBRANE ELECTRODES FOR  
LEAD(II) DETERMINATION BY SQUARE WAVE ANODIC STRIPPING VOLTAMMETRY**

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Track-etched functionalized nanoporous membrane electrodes, are thin-layer cells made from track-etched, poly(acrylic acid) (PAA) functionalized nanoporous ?-poly(vinylidene fluoride) (?-PVDF) membranes with thin Au films sputtered on each side as electrodes. The Au film is thin enough that the pores of the membranes are not completely covered. In order to form the nanoporous membranes ?-PVDF films are irradiated by swift heavy ions. After irradiation, radical tracks are left in the membranes. Etching can then be used to remove some of the radical tracks revealing nanopores. EPR and FTIR studies show that even after etching there are still radicals in the ?-PVDF. The remaining radicals mean that radio grafting of PAA is specifically localised in the walls of the nanoporous ?-PVDF. The PAA is a cation exchange polymer that adsorbes metal ions, such as Pb<sup>2+</sup>, from aqueous solutions thus concentrating the ions into the membrane. After a calibrated time the FME is transferred to an electrochemical cell for analysis. A negative potential is applied to the Au film of the FME for a set time to reduce the adsorbed ions onto the Au film working electrode. The other metalized side of the FME functions as a counter electrode. Finally, square-wave anodic stripping voltammetry is performed on the FME to determine the metal ion concentrations. The FME membranes are 9 ?m thick and have 40 nm diameter pores with a density of 1010 pores/cm<sup>2</sup>. This high pore density provides a large capacity for ion adsorption. Au ingress in the pores during sputtering forms a random array of nanoelectrodes. Like surface modified electrodes for adsorptive stripping voltammetry, the pre-concentration step for the FME is performed at open circuit. The zero current intercept of the calibration for Pb<sup>2+</sup> is 0.13 ppb and a detection limit of 0.050 ppb.