

عنوان مقاله:

Design and Development of a Chopper for Ion Beam Current Measurement and Monitoring

محل انتشار:

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خلاصه مقاله:

For the ion beam analysis of insulating materials, we have investigated the design and calibration of an ion beam chopper. The chopper consists of a holder, a chopper plate, four photo sensors, a stepper motor, and an electronic control unit. The chopper plate was designed based on sharing an equal fraction of the ion beam between the chopper and the target. The situation of the chopper to the ion beam is controllable by using four photo-sensors around it. The time intervals in which the material is analyzed and the number of incident ions measured are determined via gate pulses governed by the sensors' signals. The ion beam current was measured by charge integration at the chopper plate. We calculated the charge correction factors to eliminate the contribution of secondary electrons to the measurements. The measurements were done via Rutherford backscattering spectroscopy (RBS) analysis of a thin Au layer deposited on Si wafer with helium and proton ions in the energy range of 1-2.2 MeV with a precision of less than 5%. The charge correction factors are independent of the ion beam current.

کلمات کلیدی:

Ion Beam Analysis (IBA), Beam chopper, Ion beam current measurement, Charge integration, Ion beam monitoring

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