

技术及应用

钛膜中氘氚浓度的弹性反冲法测量

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摘要 研究采用弹性反冲探测(ERD)方法测量钛膜中氘、氚的浓度。实验所用Ti膜用磁控溅射法制备,膜厚小于100 nm,以石英玻璃(SiO₂)为底衬,Ti膜加镀了1层Ni保护膜,以防Ti膜氧化和增强Ti膜吸氢。以6.0 MeV O⁺粒子作为入射粒子,在30°方向上探测反冲粒子,在此实验条件下,O⁺粒子对D、T的碰撞截面为卢瑟福截面。对两个样品用ERD方法测量钛膜中的D、T含量,获得了D、T的面密度。测量结果表明,采用如上方法测量Ti膜中D、T浓度的误差小于7%。

关键词 [钛膜](#); [氘氚浓度](#); [弹性反冲探测](#)

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Measurement of Deuterium and Tritium Concentration in Titanium Film

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Abstract The elastic recoil detection (ERD) method was used to measure the concentration of D and T in Ti film. The Ti film with the thickness to be less than 100 nm was deposited on the smooth surface of quartz (SiO₂) substrate by means of magnetism sputter method, and covered a nickel layer with the thickness less than 10 nm in order to protect it from oxidizing and enhance the hydrogen charging. Oxygen ion beam of 6.0 MeV was selected as incident ion, and the ERD spectra were detected at the angle of 30°, then the cross-sections for O to D and T are Rutherford cross section under this experiment condition. The D and T concentrations in two samples were measured and the areal density was obtained by means of ERD method. Measurement results show that the measuring errors of D and T concentrations are less than 7%.

Key words [titanium film](#) _ [deuterium and tritium concentration](#) _ [elastic recoil detection](#)

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