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Study of Ion Beam Mixing of Te/In and Se/in systems by Cascade Collisional Mixing Model

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Ion Beam Mixing at room temperature of Te/In and Se/In bilayer systems induced by 400 KeV Ar+ ions from Jordan Van De Graaff Accelerator with fluences ranging from 1.11x10ˆ14 - 7x10ˆ15 ions/cm2 for Te/In system and 1.35x10ˆ14 - 2.3x10ˆ16 ions/cm2 for Se/In system. The systems are studied by means of AC electrical resistivity measurement, which shows higher mixing efficiency of Se/In system than Te/In system, and by 2 MeV He+ backscattering spectrometry, which shows the width of intermixed layers are 100 nm and 50 nm for Se/In and Te/In respectively.
Ion Beam Mixing for these systems are studied theoretically by cascade collisional mixing "Haff and Switkowski" model , the nuclear stopping powers are calculated by TRIM computer code. The diffusion rate is calculated for the systems Te/In and Se/In, which showed that the diffusion rate and mixed layer for the system Se/In is greater than that of Te/In, which agree with experimental results. The theoretical study is a tool and indication to determine the efficiency of mixing between upper and lower layers before preparation and irradiation of samples, which provide the effort and money.

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