

Study of some light, medium and heavy-ion induced reactions at the cyclotron energies.

I. A. Rizvi*

Department of Physics, Aligarh Muslim University, Aligarh (U.P) – 202002 India

* email: isarrizvi@rediffmail.com

Excitation functions (EFs) for various reactions induced by light, medium and heavy ions were investigated using the stacked foil activation technique and high purity germanium (HPGe) γ -ray spectroscopy method. Theoretical EFs for the light and medium ion induced reactions were also calculated with and without inclusion of pre-equilibrium (PE) particle emission in the framework of a geometry-dependent hybrid model using ALICE / LIVERMORE-82 and ALICE-91 codes. It was found that the PE contribution is more pronounced in the high energy tail region of the EF and experimental data are explained only when the PE emission phenomenon is also taken into account along with the equilibrium decay. Evaporation residues populated through the heavy ion induced reactions were analyzed in the framework of statistical model code PACE-4. The experimentally measured EFs were, in general, found to be in good agreement with the theoretical model predictions. However, for α -emitting channels, the measured EFs were higher than the predictions of the theoretical model code, which may be accredited to incomplete fusion reaction at these energies. An attempt has also been made to estimate the incomplete fusion fraction for the present work, which revealed that the fraction is sensitive to various entrance channel parameters.