

PROBING SURFACE DIFFUSENESS OF NUCLEUS-NUCLEUS INTERACTION POTENTIAL IN MASS RANGE A=24-206

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In the low energy heavy ion collision, the fusion of colliding nuclei has always been of central interest. Significant amount of work is being carried out to portray the addressal of the measured fusion cross-sections by opting a variety of nucleus-nucleus interaction potential and associated parameters. Appropriate knowledge of the nuclear potential plays decisive role to exhibit true picture of nuclear collisions and subsequent dynamics. The nuclear potentials calculated using proximity theorem are characterized via various parameters such as surface energy coefficient, surface diffuseness, potential depth, radius etc. Several authors employed a variety of parameters to account for appropriate barrier characteristics and related nuclear behaviour. These parameters play significant role in deciding the shape of the potential, height of the fusion barrier, barrier position etc and hence subsequently affect the fusion cross-sections significantly. In the present work we intent to focus on the influence of diffuseness parameter “ a ” on fusion process. For the purpose we have employed heavy ion induced reactions covering wide mass range i.e. A=24-206. Here, we have estimated the fusion cross-sections of various nuclei formed via different projectile- target combinations such as $^{12}\text{C}+^{12}\text{C}$, $^{12}\text{C}+^{58}\text{Ni}$, $^{12}\text{C}+^{128}\text{Te}$ and $^{12}\text{C}+^{194}\text{Pt}$ using the Wong approach. The diffuseness parameter $a = 0.6$ fm seems more appropriate for projectile-target product upto 200 ($Z_p Z_T \sim 200$), which is close to the standard value of 0.63 fm. However for the heavier mass nuclei relatively higher value $a = 0.99$ fm is more suitable to address the fusion data. We are in the process to evaluate role of ‘ a ’ for some intermediate reactions to have comprehensive description regarding choice of diffuseness parameter in heavy ion induced reactions covering wide spectrum of nuclear mass. Beside this we are also interested to explore the effect of energy dependence on diffuseness parameter.