

PREFORMATION OF ALPHA-PARTICLE FOR FAVOURED TRANSITIONS USING PROXIMITY POTENTIAL

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Preformation for alpha-particle for favoured transitions is calculated using proximity potential. Calculations are done using an indirect semi-empirical method in which experimental values of half-lives are taken into consideration. Values of assault frequency are determined using a modified formula, and penetrability is calculated using proximity potential. Calculations are carried out for favoured transitions of all alpha emitters, i. e., 179 e-e, 80 e-o, 98 o-e and 55 o-o alpha emitters. As expected from the shell model, preformation values obtained are highest for e-e alpha emitters, followed by e-o and o-e alpha emitters. The lowest values are obtained for o-o alpha emitters. It is also found that preformation values are highest for transitions originating in the ground state than for transitions originating in the isomeric state. This suggests that there is greater preformation of alpha-particle in the ground state than in the isomeric state. The preformation values also show a distinct minima at the neutron magic number, $N=126$. Comparison of these semi-empirical values is also done with values obtained by microscopic methods. Comparison indicates that the trend of values obtained by the two methods is quite similar. As there is no universal formula for calculating the assault frequency, hence, the preformation values of the above semi-empirical method can be brought very close to the microscopic values by adjusting the assault frequency.

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