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Proton optical model potential for p-process study

The stable neutron deficient nuclei with mass number of 74<A<196 (nearly 30-35 nuclei) not produced via the s- or r- process are known as p-nuclei. Their isotopic abundances are considerably lower than the other stable isotopes of the same element. Generally accepted that s- or r- isotopes are serves as seed nuclei for the p-nuclei production.
In the stellar explosive site, the series of (γ,n) reactions on s- and r- seed nuclei synthesized the proton rich stable isotopes. Hence the neutron separation energy is increasing and at the same time the proton and alpha separation energy is decreasing, then (γ,p) and (γ,α) reactions starts to play an important role for p-nuclei production.
The γ-disintegration reactions by gamma-beam is difficult to perform in laboratory and hence it can be studied from inverse reactions by the principle of detailed balance. Investigation of the Experimental charge particle capture reactions with the theoretical prediction one have to use the Hauser-Feshbach statistical model.
The choice of proton optical model potential is one of important input parameters for Hauser-Feshbach calculation. In this work, the published proton elastic scattering on the p-nuclei in the energy near coulomb barrier were studied for obtaining proton optical potential. ^{76}Se, ^{86}Sr, ^{92,94}Mo, ^{104}Pd, ^{106,108}Cd, ^{115}In, ^{112,116}Sn, ^{134}Ba, ^{148}Sm, ^{171}Yb nuclei were used. Optical potential search code SFRESCO was used to calculate the Wood-Saxon proton potential.

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