Experimental and theoretical astrophysical S-factors and reaction rates of threshold (p,n)-reactions on Pd isotopes

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Experimental astrophysical S-factors of the reactions \(^{104}\text{Pd}(p,n)^{104}\text{Ag}\), \(^{105}\text{Pd}(p,n)^{105}\text{Ag}\), \(^{106}\text{Pd}(p,n)^{106}\text{Ag}\), \(^{108}\text{Pd}(p,n)^{108}\text{Ag}\), and \(^{110}\text{Pd}(p,n)^{110}\text{Ag}\) were calculated from the measured activation cross sections of excitation of residual nucleus isomeric pairs in the incident proton energy range (4-9) MeV. The obtained data are compared with the predictions of the statistical model code NON-SMOKER. The satisfactory agreement is observed for the reactions on \(^{105}\text{Pd}\), \(^{108}\text{Pd}\) and \(^{110}\text{Pd}\) while the theory slightly underestimates the data for the reaction \(^{104}\text{Pd}(p,n)^{104}\text{Ag}\) and overestimates for the reaction \(^{106}\text{Pd}(p,n)^{106}\text{Ag}\). Combining experimental and theoretical data the reaction rates were derived for the stellar temperatures up to \(8.4 \cdot 10^9\) Kelvin. Dependence of covered temperature on the reaction threshold is considered.