New thermonuclear reaction rates in *rp* process of *sd* shell nuclei

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We utilize shell-model with newly constructed isospin non-conserving (INC) Hamiltonians to derive a new set of resonant rapid-proton capture (*rp*) reaction rates of *sd*-shell nuclei which is important for astrophysical modelling of isotopic abundances. These rates include ^{23}Al(p,γ)^{24}Si, ^{35}Ar(p,γ)^{36}K, ^{31}Cl(p,γ)^{32}Ar and a few others. The INC Hamiltonian is a composition of an isospin-conserving Hamiltonian, Coulomb interaction and effective isospin-symmetry breaking forces of nuclear origin. The advantage is that the calibrated INC Hamiltonian permits us to predict unknown nuclear levels lying in the range of Gamow window and to describe a set of more accurate decay modes than the shell model with isospin symmetry. We find that proton capture on excited states of some target nuclei significantly contribute to the total *rp*-process rates, e.g. ^{23}Al(p,γ)^{24}Si and ^{31}Cl(p,γ)^{32}Ar. We compare our rates with rates provided by currently available statistical model.