

Publication

Astrophysical reaction rates from statistical model calculations

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Theoretical reaction rates in the temperature range 0.01×10^9 less than or equal to $T(K)$ less than or equal to 10.0×10^9 are calculated in the statistical model (Hauser-Feshbach formalism) for targets with 10 less than or equal to Z less than or equal to 83 (Ne to Bi) and for a mass range reaching the neutron and proton driplines. Reactions considered are (n, γ) , (n, p) , (n, α) , (p, γ) , (p, α) , (α, γ) , and their inverse reactions. Reaction rates as a function of temperature for thermally populated targets are given by seven analytical parameter fits. To facilitate comparison with experimental rates, the stellar enhancement factors are also tabulated. Two complete sets of rates have been calculated, one of which includes a phenomenological treatment of shell quenching for neutron-rich nuclei. These extensive datasets are provided on-line as electronic files, while a selected subset from one calculation is given as printed tables. A summary of the theoretical inputs and advice on the use of the provided tabulations is included. (C) 2000 Academic Press.

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