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Alpha-capture reaction rates for ^{22}Ne(α,n) and ^{22}Ne(α,γ) via sub-Coulomb α-transfer and its effect on final abundances of s-process isotopes. HESHANI JAYATISSA, GRIGORY ROGACHEV, VLADILEN GOLDBERG, EVGENY KOSHCHIY, OSCAR TRIPPELLA, JOSHUA HOOKER, CURTIS HUNT, SRITEJA UPADHYAYULA, ETHAN UBERSEDER, BRIAN ROEDER, ANTTI SAASTAMOINEN, Cyclotron Institute / Texas A&M University — The ^{22}Ne(α,n) reaction is a very important neutron source reaction for the slow neutron capture process (s-process) in asymptotic giant branch stars. Direct measurements are extremely difficult to carry out at Gamow energies due to the extremely small reaction cross section. The large uncertainties introduced when extrapolating direct measurements at high energies down to the Gamow energies can be overcome by determining the partial α-width of the relevant states in indirect measurements. This can be done using α-transfer reactions at sub-Coulomb energies to reduce the dependence on optical model parameters. The α-transfer reaction of ^{22}Ne(^{6}Li,d)^{26}Mg was carried out at the Cyclotron Institute at Texas A&M University to study this reaction. It appears that the widths of the near α-threshold resonances of ^{26}Mg are quite different for similar ^{22}Ne(^{6}Li,d) reactions carried out previously using different higher energies. This discrepancy affects the final reaction rate of the ^{22}Ne(α,n) reaction, and the rate of the competing ^{22}Ne(α,γ) reaction, thus affecting the final abundances of the s-process isotopes.

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