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THE ^{6}Li(^{18}O, ^{17}O)^{7}Li REACTION MECHANISMS AND ^{7}Li + ^{17}O POTENTIAL

Angular distributions of the ^{6}Li(^{18}O, ^{17}O)^{7}Li reaction were measured at E_{lab}(^{18}O) = 114 MeV for ground and excited states of exit nuclei. The data were analyzed within the coupled-reaction-channels method (CRC). The ^{6}Li + ^{18}O elastic and inelastic scattering channels as well as the simplest one- and two-step reactions were included in the coupled-reaction-channels scheme. In CRC calculations, the ^{6}Li + ^{18}O potential with parameters deduced from the elastic scattering data, was used for the entrance reaction channel. The spectroscopic amplitudes of nucleons and clusters were calculated within the translational-invariant shell model. The ^{7}Li + ^{17}O potential parameters were deduced by fitting ^{6}Li(^{18}O, ^{17}O)^{7}Li reaction data. Isotopic differences of the ^{7}Li + ^{17}O, ^{7}Li + ^{18}O and ^{7}Li + ^{16}O potential, as well as the reaction mechanisms are studied.

Keywords: heavy-ion reactions, coupled-reaction-channels method, spectroscopic amplitudes, optical potentials, reaction mechanisms.