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ELASTIC AND INELASTIC SCATTERING OF ^{14}N IONS BY ^7Li AT 80 MeV

Angular distributions of the $^7\text{Li} + ^{14}\text{N}$ elastic and inelastic scattering as well as the $^7\text{Li}(^{14}\text{N}, X)$ reactions with production of $^{13, 15, 16}\text{N} + ^{8, 6, 5}\text{Li}$, $^{11, 12, 13, 14}\text{C} + ^{10, 9, 8, 7}\text{Be}$, $^{10, 11, 12}\text{B} + ^{11, 10, 9}\text{B}$ nuclei and others were measured at $E_{\text{lab}}(^{14}\text{N}) = 80$ MeV. The data were analyzed within the optical model and coupled-reaction-channels method. The elastic and inelastic scattering, reorientations of ^7Li and ^{14}N in ground and excited states as well as the prominent one- and two-step transfers were included in a channels-coupling-scheme. The $^7\text{Li} + ^{14}\text{N}$ optical potential parameters for ground and excited states of ^7Li and ^{14}N as well as deformation parameters of these nuclei were deduced. The contributions of one- and two-step transfers in the $^7\text{Li} + ^{14}\text{N}$ elastic and inelastic scattering channels were estimated.

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