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^{14}C(^{11}B, ^{9}Be)^{16}N REACTION MECHANISMS AND POTENTIAL OF THE ^{9}Be + ^{16}N INTERACTION

New experimental data for differential cross sections of the ^{14}C(^{11}B, ^{9}Be)^{16}N reaction were measured for the ground states of ^{9}Be and ^{16}N nuclei as well as for the excited states of ^{16}N at the energy $E_{lab.}$(^{11}B) = 45 MeV. The reaction data were analyzed within the coupled-reaction channels method (CRC) for one- and two-step transfers of nucleons and clusters. In the CRC-calculations, the optical potential deduced from the analysis of the ^{11}B + ^{14}C elastic scattering data was used for the entrance reaction channel. Needed spectroscopic amplitudes of nucleons and clusters in nuclei were calculated within shell-model. ^{9}Be + ^{16}N optical potential parameters were deduced by fitting CRC cross-sections to the ^{14}C(^{11}B, ^{9}Be)^{16}N reaction data. Contributions of one- and two-step transfers of nucleons and clusters into the ^{14}C(^{11}B, ^{9}Be)^{16}N reaction cross-sections were obtained.

Keywords: nuclear reactions, optical model, coupled-reaction-channels method, folding-model, spectroscopic amplitudes, optical potentials, reaction mechanisms.