REACTION $^{12}C(n,n')3\alpha$ FROM THRESHOLD TO E_n=35 MeV

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The reaction $^{12}C(n,n')3\alpha$ induced by neutrons of a continuous energy spectrum has been studied in a kinematically complete experiment from threshold to 35 MeV.From the three alpha correlation spectra, measured by nuclear emulsion technique, following information were deduced:

1.NUCLEAR DATA. Total cross sections and alpha particle energy spectra have been obtained in function of incident neutron energy. Special attention has been paid to several corrections needed to account for background effects and losses due to different cut-off conditions.

2.REACTION MECHANISM. The analysis of data by Dalitz diagrams and single excitation spectra of intermediate ^{12}C, ^{9}Be, ^{5}He and ^{8}Be states (test for FSI), by momentum distribution (test for QFS), as well as the comparison of the experimental spectra with the pure phase space distribution yields information on contributions of different reaction mechanisms to the total cross section. In the region above E_n=20 MeV, which so far has not been investigated, the predominant contribution of the sequential decay mechanism, involving Be_{gs} and $Be_{2.9}$ intermediate states, was observed.

3.APPLICATION. The mean energy of the emitted charged particles needed for the determination of the kerma factors has so far been calculated by assuming the reaction mechanism of the process. The values thus obtained have been found to be very sensitive on the assumed composition of different outgoing channels. In the present study the alpha particle spectra are determined experimentally, offering the more trustfully data for kerma factor calculation.