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THE 151 MeV ^{20}Ne + ^{59}Co REACTION LEADING TO CONTINUUM ENERGY SPECTRA

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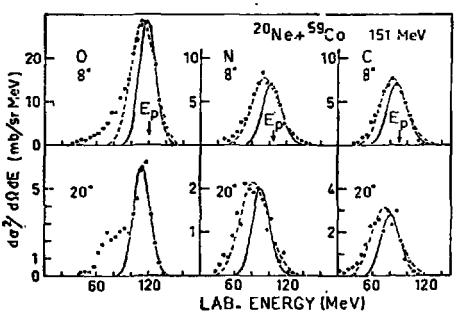
Although continuum energy spectra have been observed for many heavy-ion reactions, attempts to understand the shape of these spectra in terms of reaction mechanisms are quite recent. Beside the low-energy regime with thermal equilibration, a rapid onset of projectile fragmentation[1] probably occurs at about 15 MeV/nucleon above the Coulomb barriers. DWBA calculations[2] could describe the energy spectra for the reaction $^{40}Ca(^{20}Ne, ^{16}O)$ at 262 and 149 MeV by assuming the simultaneous occurrence of transfer and break-up reactions, with larger energy loss and wider energy distribution for transfer than for break-up reactions.

In the present work, angular distributions of inclusive spectra were measured with an ionization chamber for elements from B to Al produced in the bombardment of a ^{59}Co target by 151 MeV ^{20}Ne projectiles from the Grenoble cyclotron. A grazing angle of about 18° lab. was obtained from the measured elastic scattering angular distribution. Most of the energy spectra measured are symmetrical bell-shaped distributions. For the O fragment however, the spectra at forward angles have a long tail in the lower energy part in agreement with previous measurements[2]. Some spectra are shown in the fig., where Ep is the energy of the fragment having the projectile velocity. The O spectrum at 20° lab. has a narrow component attributable to the break-up reaction. Such a feature is not clearly observed for the other fragments. Calculations were done with the statistical fragmentation model[3]. The solid curves are obtained with a T = 2 MeV temperature while the dashed curves come from the fit of the full distribution. The overall features of the present data are not at variance with the theoretical approach of the Texas group[2].



1. C.K. Gelbke et al., Phys. Rep. 42 (1978) 311
2. H. Fröhlich et al., Phys. Rev. Lett. 42 (1979) 1518
3. A.S. Goldhaber, Phys. Lett. 53B (1974) 306