

## Reaction mechanisms of $^{17}\text{F}+^{58}\text{Ni}$ at energies around the Coulomb barrier

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With the radioactive ion beam  $^{17}\text{F}$  provided by CRIB (Center for Nuclear Study Radioactive Ion Beam separator), the reactions on the proton-shell closed  $^{58}\text{Ni}$  target were measured at four energies around the Coulomb barrier: 46.0, 49.8, 57.9 and 65.1 MeV. A specially designed detector array, which consists of ionization chambers and silicon detectors, was used to identify the heavy and light reaction products simultaneously. The angular distributions of the quasi-elastic scattering and inclusive breakup were obtained. The quasi-elastic data were analyzed with the framework of the optical model to deduce the total reaction cross section. The breakup angular distribution can be reproduced reasonably by the continuum-discretized coupled-channels (CDCC) and IAV (Ichimura, Austern, Vincent) model calculations, hence the cross sections of breakup reactions can be derived. Meanwhile, the fusion cross section can be determined by measuring the fusion-evaporation proton and alpha. The resulting fusion excitation function shows an enhancement at energies below the Coulomb barrier, and some suppression above the barrier.

### Summary

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