Abstract Submitted
for the APR16 Meeting of
The American Physical Society

Does the α Cluster Structure in Light Nuclei Persist Through the Fusion Process?[1] JUSTIN VADAS, TRACY STEINBACH, JON SCHMIDT, VARINDERJIT SINGH, SYLVIE HUDAN, ROMUALDO DESOUZA, Indiana University, LAGY BABY, SEAN KUVIN, INGO WIEDENHOVER, Florida State University — Despite the importance of light-ion fusion in nucleosynthesis, a limited amount of data exist regarding the de-excitation following fusion for such systems. The characteristics of α emission following the fusion of ^{18}O and ^{12}C nuclei have been explored. Alpha particles were detected in coincidence with evaporation residues (ER) and identified on the basis of their energy and time-of-flight. ERs were characterized by their energy spectra and angular distributions while the α particles were characterized by their energy spectra, angular distributions, and cross-sections. While the energy spectra and angular distributions for the α particles are relatively well reproduced by statistical model codes, the measured cross-section is substantially underpredicted by the models. Comparison of the measured relative α cross-section at low $E_{c.m.}$ for ^{18}O+^{12}C, ^{16}O+^{12}C, and ^{16}O+^{13}C indicates that the α cluster structure of the initial projectile and target nuclei influences the α emission following fusion. The underprediction of the relative α emission by the statistical model codes suggests that the failure of these models to account for α cluster structure is significant.

[1]Supported by DOE Grant No. DE-FG02-88ER-40404 and NSF Grant No. 1342962

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Date submitted: 08 Jan 2016 Electronic form version 1.4