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The ^{132}Sn + ^{96}Zr reaction: a study of fusion enhancement/hindrance WALTER LOVELAND, A.M. VINODKUMAR, JAMES NEEWAY, PETER SPRUNGER, LANDON PRISBREY, Oregon State University, DONALD PETERSON, Argonne National Laboratory, J.F. LIANG, DAN SHAPIRA, Oak Ridge National Laboratory, C.J. GROSS, Oak Ridge Natonal Laboratory, R.L. VARNER, Oak Ridge National Laboratory, J.J. KOLATA, A. ROBERTS, University of Notre Dame, A.L. CARALEY, State University of New York at Oswego — Capture-fission cross sections were measured for the collision of the massive nucleus ^{132}Sn with ^{96}Zr at center of mass energies ranging from 192.8 to 249.6 MeV in an attempt to study fusion enhancement and hindrance in this reaction involving very neutron-rich nuclei. Coincident fission fragments were detected using silicon detectors. Using angle and energy conditions, deep inelastic scattering events were separated from fission events. Coupled channels calculations can describe the data if the surface diffuseness parameter, $\boldsymbol{a}$, is allowed to be 1.10 fm, instead of the customary 0.6 fm. The measured capture-fission cross sections agree moderately well with model calculations using the dinuclear system (DNS) model. If we use this model to predict fusion barrier heights for these reactions, we find the predicted fusion hindrance, as represented by the extra push energy, is greater for the more neutron-rich system, lessening the advantage of the lower interaction barriers with neutron rich projectiles.

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