Alpha induced cross section measurements on 162Er for the astrophysical γ-process

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The cross sections of the Er-162(alpha, gamma) Yb-166 and Er-162(alpha, n) Yb-165 reactions have been measured for the first time. The radiative alpha capture reaction cross section was measured from E-c.m. = 16.09 MeV down to E-c.m. = 11.21 MeV, close to the astrophysically relevant region (which lies between 7.8 and 11.48 MeV at 3 GK stellar temperature). The Er-162(alpha, n) Yb-165 reaction was studied above the reaction threshold between E-c.m. = 12.19 and 16.09 MeV. The fact that the Er-162(alpha, gamma) Yb-166 cross sections were measured below the (alpha, n) threshold at first time in this mass region opens the opportunity to study directly the alpha-widths required for the determination of astrophysical reaction rates. The data clearly show that compound nucleus formation in this reaction proceeds differently than previously predicted. (C) 2014 The Authors. Published by Elsevier B.V.
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