Competition between Fusion-Fission and Quasifission Processes in the $^{32}S+^{184}W$

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The angular distributions of fission fragments for the $^{32}S + ^{184}W$ reaction at center-mass-energies of 118.8, 123.1, 127.3, 131.5, 135.8, 141.1, and 144.4 MeV were carried at tandem accelerator HI-13 of China Institute of Atomic Energy. The experimental fission excitation function and angular anisotropies of fission fragments and mean square angular momentum of compound nucleus are obtained. The measured fission cross sections of $^{32}S+^{182,184}W$, which are from this work and literature, are decomposed into fusion-fission, quasi-fission and fast fission contributions by means of the dinuclear system model. The total evaporation residue and fusion-fission excitation functions are calculated in the framework of the advanced statistical model. The hindrance to complete fusion at small collision energies increases due to the increase of quasi-fission events and it is explained by the elongated shape of the dinuclear system which is formed in collisions with small orientation angles to the beam direction. An increase of the hindrance to complete fusion at large beam energies is explained by the dependence of the quasi-fission and intrinsic fusion barriers of dinuclear system on its angular momentum: at large angular momentum the quasifission barrier decreases and the intrinsic fusion barrier increases. In these reactions the contributions of fusion-fission and quasifission fragments are comparable.