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Multinucleon Transfer Reactions for fission study

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The MNT reaction allows us to produce many fissioning nuclei, including neutron-rich nuclei, which cannot be populated by other reactions. Also, excitation energy of compound nucleus distributes widely. These properties are used to obtain fission-fragment mass distribution (FFMDs) for many nuclides as well as their excitation-energy dependence [1,2,3]. The experiments were carried out at the JAEA tandem facility using ^{18}O beam and various radioactive target nuclei. From the data, the probability of each multi-chance fission (fission after neutron emission) was quantified for the first time [4,5]. From the threshold of the excitation function of fission probably, fission barrier height was derived [6], one of the key observables to verify fission models.

Our setup for MNT-induced fission allows us to obtain data for MNT mechanism itself. From the fission-fragment angular distribution relative to the rotational axis, we have determined the average angular momentum for each MNT channel [7]. The value is useful to determine the survival probability of compound nucleus to derive the cross sections of neutron-rich evaporation residues generated in MNT reactions.

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Primary author(s) : KATSUHISA NISHIO (Japan Atomic Energy Agency)

Presenter(s) : KATSUHISA NISHIO (Japan Atomic Energy Agency)

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