Motivation for the determination of the ^{244}Cm effective neutron capture cross-section

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The social acceptability of nuclear power reactors is related to the waste management of long-lived fission products (LLFP) and minor actinides (MAs) existing in spent nuclear fuels. The MAs (^{241,243}Am, ^{244,245}Cm, *etc.*) are important in the nuclear waste management, because the presence of these nuclides induces long-term radiotoxicity because of their relatively long half-lives. **Figure 1** illustrates the section of the chart of the nuclides displaying the relevant reactions and decays of Am and Cm isotopes. The Am isotopes generate the higher actinides as the Cm isotopes through neutron capture reactions. Moreover, the Cm isotopes also generate the higher actinides. The partitioning and transmutation of MAs have some merits in the reprocessing of spent nuclear fuels.**[1]** When considering transmutation, the accurate data of neutron capture cross-sections are necessary. In this view point, the cross-section measurements have been made by the activation method. The ^{243}Am effective cross-section was measured in the past.**[2]** It was found that the obtained result would affect the ^{244}Cm production by about 10% in comparison with the prediction by the evaluated data. Therefore, our concern was focused to measure the cross-section for ^{244}Cm to discuss the production of more higher Cm isotopes. **Figure 2** plots the measured and evaluated data for the thermal-neutron capture cross-section and the resonance integrals of ^{244}Cm. As seen in Fig.2, there are only a few of data. It seems that the value of the thermal neutron capture cross-section by Gavrillov would be adapted as the evaluated data. This situation would show the necessity of re-measurement of the ^{244}Cm cross-section. In the session, our research activities for the determination of the effective cross-section of ^{244}Cm will be reported together with our future plans.

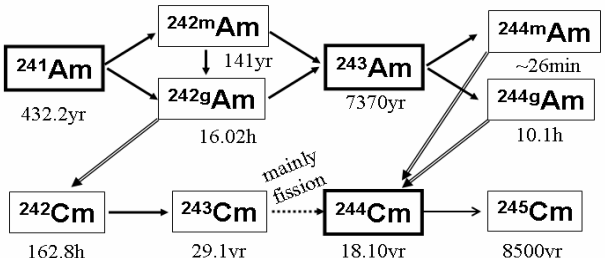

Fig. 1 Schematic view of the reaction chain of Am and Cm isotopes.

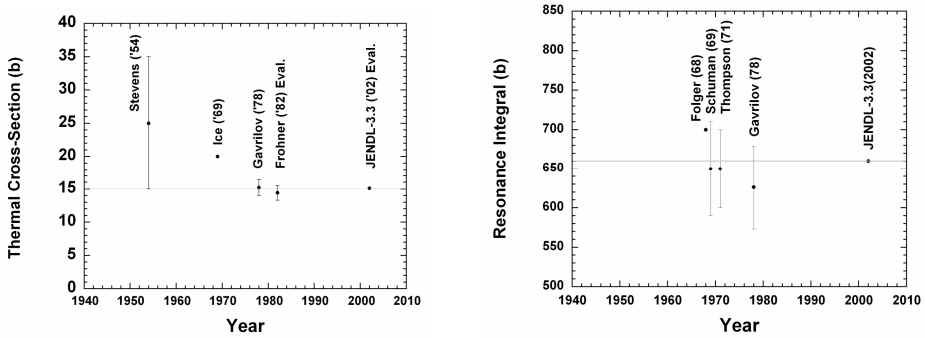

Fig. 2 Measured and evaluated data for the thermal-neutron capture cross-section and the resonance integral of ^{244}Cm

[1] H.Takano, T.Ikegami, *Seventh Information Exchange Meeting*, Jeju, Republic of Korea, Oct.14-16, 2002, pp.23-35.
[2] M. Ohta *et al.*, *J.Nucl.Sci.Technol*, **43**, p.1441 (2006).