Recent Development in Muon Catalyzed Fusion Experiments — Discovery of Anomalous Condensed-Matter Effect —

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Recently, significant progresses have been marked for the experimental investigations of the fundamental understandings of the muon catalyzed fusion (μCF) phenomena[1)] in D-T and other hydrogen systems at RIKEN-RAL muon facility. Distinguished examples are discoveries of (a) an anomalous ionization process in liquid/solid D-T mixture of the $(\alpha\mu)^+$ ion formed as a sticking process right after the fusion reaction in (dtμ) molecule[2)] and (b) anomalous temperature dependence in solid D-T mixtures in both (dtμ) molecular formation *(increase at higher temperature)* and $(\alpha\mu)^+$ ionization process *(increase at higher temperature)*[3)]. These are suggesting a way to achieve a break-even in μCF.

Furthermore, some future progresses of the μCF studies will be realized due to the successful launching of the advanced accelerator projects such as JAERI-KEK Joint Hadron Accelerator Project and others. Public demonstration of fusion energy at the level of kW will be realized.

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