Studies on muonium production from silica aerogel with sub-structure for the muon g-2/EDM experiment

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An ultra cold muon beam with extremely small transverse dispersion is being developed for the J-PARC muon g-2/EDM experiment (E34)[1]. An incident muon stopped in a silica aerogel sample captures an electron in the sample to form muonium (Mu). The Mu is emitted to vacuum with thermal velocity at room temperature. Ultra slow muons with extremely small energy can be realized by laser ionization of the Mu. A high intensity ultra cold muon beam is required to achieve good statistical precision for the J-PARC g-2/EDM experiment.

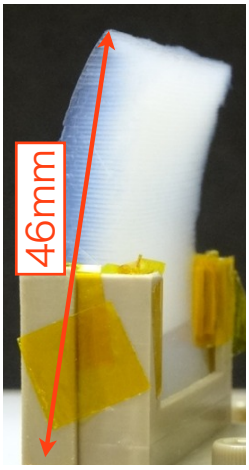

Fig. 1 an aerogel sample with substructures produced by laser irradiation

A new material with high Mu emission efficiency using the silica aerogel has been produced (Figure 1). Mu production yields from several types of silica aerogel with different momenta of incident muons have been measured. Measurements were carried out at TRIUMF on the M15 beamline in 2013. In this poster, the analyzed result of the measurement will be presented.

References

[1] J-PARC muon g-2/EDM collaboration, a conceptual design report (2011)