O39 | **Recent research and current status of the accelerator based slow positron beam facility at AIST**

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At AIST, a dedicated electron accelerator is used to produce an intense slow positron beam. This facility is primarily dedicated to materials research via positron annihilation lifetime spectroscopy (PALS). PALS measurements may be performed with unfocussed (~10 mm) or focused (~50-100 μm) variable energy (~ 1 – 30 keV) pulsed slow positron beams [1]. The focused microbeam uses a single stage transmission type re-moderator and can measure positron lifetimes with a temporal resolution of around 200-300 ps [2]. This microbeam (PPMA: Positron Probe MicroAnalyzer) can be used to perform 1D scans or 2D maps of positron lifetime (and thus defect or free volume size distributions) of the sample [3]. We also have developed techniques to extract the beam into air through a thin vacuum window for achieving PALS in actual environmental condition [4]. Our accelerator based slow positron beamline facility is open to external (both domestic and international) users through the "Nanotechnology Platform" open access program [5].

In addition to our work with slow positron beams, we are also interested in developing techniques for PALS in bulk (~ cm sized) samples. To this end, we have performed preliminary experiments using positrons generated inside the sample by high energy photons from a very short pulse length (~ps) S-band electron accelerator [6].

In the presentation we will give an overview of some recent research at our facility and outline some of our plans for further developments.

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[3] N. Oshima *et al., Appl. Phys. Lett*. 94 194104 (2009)
[4] W. Zhou *et al., Appl. Phys. Lett*. 101, 014102 (2012)
[5] http://nanonet.mext.go.jp/
[6]Y. Taira *et al., Rad. Phys. Chem*. 95 30 (2013)