

Low background techniques from XMASS

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An 800kg liquid xenon detector (XMASS) was constructed in Kamioka laboratory, Japan in 2010, and a commissioning run was conducted from November 2010 to June 2012. Although we have achieved the design level of internal backgrounds, it was found that surface contamination is the major contribution of the remaining background. The origins of the surface background have been extensively investigated and they were identified to be 1) The upstream portion of ^{238}U decay chain and ^{210}Pb found in the aluminum used for sealing PMTs materials, and 2) ^{210}Pb on the inner surface of the detector.

In order to reduce these backgrounds, countermeasures have been devised and refurbishment of the detector is ongoing. Techniques for the reduction of detector surface contamination (covering of PMT aluminum, electro-polishing of surface elements) and keeping the assembly environment clean (control of low radon level, exposure time, electro static and dust) for the refurbishment work will be reported.

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