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Monitoring stability of Gd-loaded liquid scintillator at RENO

Reactor experiment for neutrino oscillation (RENO) began data-taking from August 2011. It successfully observed reactor anti-neutrino disappearance in April 2012 to measure the smallest mixing angle of theta13. Two identical detectors, one at near location and the other at far location, are constructed at the Yonggwang nuclear power plant in South Korea, to compare the observed reactor neutrino fluxes. The RENO detector consists of four concentric cylindrical layers: the target, the gamma-catcher, the buffer, and the veto. Each RENO detector is filled with 16 mass tons of Gadolinium-loaded liquid scintillator (GdLS) in the neutrino target region, and with 28 mass tons of unloaded liquid scintillator (LS) in the gamma-catcher region surrounding the target. LS was developed to satisfy chemical, physical, optical properties, and safety requirements. Linear alkyl benzene (LAB) was chosen as a solvent because of its high flash-point, sufficient light yield, and being environmentally friendly. GdLS is carefully developed to keep a long attenuation length and high light yield for a longtime period. GdLS has not shown any hint of degradation or instability for more than 2 years. In this poster, characteristics and mass production of the RENO LS and GdLS will be reviewed.

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