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Status of the AMoRE neutrinoless double beta decay experiment

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The AMoRE (Advanced Mo-based Rare process Experiment) intends to find an evidence for neutrinoless double beta decay of Mo-100 by using a cryogenic technique with molybdate based crystal scintillators. The crystals, which are cooled down to 10~20 mK temperatures, are equipped with MMC-type phonon and photon sensors to detect both thermal and scintillation signals produced by a particle interaction in the crystal to achieve high energy resolution and efficient particle discrimination. The AMoRE-pilot, almost completed as an R&D phase, is an array of six 48deplCa100MoO4 crystals with a total mass of about 1.9 kg and is running at the 700-m-deep YangYang underground laboratory. The AMoRE-I will have about 5 kg of crystals, mostly 48deplCa100MoO4 and several R&D crystals such as Li2100MoO4 and Na2100MoO7. Significant improvement of effective Majorana neutrino mass sensitivity at the level of inverted hierarchy of neutrino mass, 20-50 meV, could be achieved by the AMoRE-II with 200 kg of molybdate crystals at the new 1,000 m deep underground laboratory excavated by the end of 2019 in the Handeok iron mine. We have already secured 50 kg of Mo-100 isotope out of 120 kg contracted for the AMoRE-II experiment. Results of the AMoRE-pilot and status of the AMoRE-I and AMoRE-II preparation will be presented.

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