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AN EXPERIMENTAL STUDY ON HUMIDITY CONDENSATE RECLAMATION FOR MANNED
SPACE FLIGHT

Abstract

Efficient Water Recovery from humidity condensate is necessary for the long-term manned space exploration program. The main contaminants in humidity condensate are short chain alcohols, carboxylic acids, nitrogen organic compounds and other hydrophilic low molecular weight organics. Many techniques have been used to remove contaminants from humidity condensates such as biological treatment, catalytic oxidation, multifiltration or combined treatments. In this paper, the feasibility of humidity condensate wastewater treatment by electro-catalytic oxidation and by O₃/UV methods is verified. For the electro-catalytic oxidation treatment method, we investigate the effects of various process conditions, such as cell voltage, electrolyte concentration, on TOC and COD removal efficiency and on its degradation products with the boron-doped diamond anode. For the O₃/UV treatment method, the degradation efficiencies of humidity condensate at various process conditions are also studies. Based on this, the advantages and disadvantages of the two methods were compared from several aspects.