

Abstract Submitted
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Variable Temperature Setup for Scanning Electron Microscopy in Liquids and Atmospheric Pressure Gaseous Environments AHMED AL-ASADI, JIE ZHANG, JIANBO LI, LAURINE DENAULT, RADISLAV POTYRAILO, ANDREI KOLMAKOV, None — A thermoelectric cooling / heating setup for commercial Quantomix QX WETSEM scanning electron microscopy environmental cells was designed and tested. This addition allows extending ambient pressure *in situ* studies to be conducted in a wide temperature range both in liquid and gaseous environments. Instead of cooling/heating the entire body of QX-WETCELL, ultrathin polyimide electron transparent membrane window supported by metal mesh on the top of the cell has been used as an agent for heat transfer to/ from the Peltier element. A butterfly wing of *Morph sulkowskyi* has been used as a model object in the QX-WETCELL's chamber due to its unique micro/nanostructure and peculiar wettability behavior. The dynamics of the water desorption, condensation and freezing processes were observed complementary using both optical microscopy and Scanning Electron Microscopy *in vivo*. The observations reveal that the initial droplet formation were most likely taking place on the top of the wing ridges due to the waxy component of its surface. In addition, The SEM observation showed that the high intensity electron beam can heat the butterfly wing locally delaying the water condensation and freezing processes.

Ahmed Al-Asadi
None

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