

Abstract Submitted
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Chlorophyll-a self-assembly: A low temperature STM investigation VIOLETA IANCU, SAW-WAI HLA, Quantitative Biology Institute, and Department of Physics and Astronomy, Ohio University, Athens, Ohio, 45701, USA — We investigate self-assembly of chlorophyll-a molecules on a Au(111) surface by using a low temperature scanning tunneling microscope (LT-STM) at 4.6 K. Chlorophyll-a is a vital resource for the sustenance of life on Earth and responsible for the green color in plant leaves. Chlorophyll-a forms hexagonal close-packed structures that grow epitaxially on Au(111). The STM images show the detailed structure of the self-assembled molecular (SAM) layer where the molecules are positioned in pairs with the heads facing each other. Within a single row along the long-molecular axis direction, the molecules are assembled in an alternating head-tail-tail-head arrangement. The tunneling spectroscopy of single chlorophyll-a molecules inside this SAM layer reveals that their lowest unoccupied molecular orbital (LUMO) is located at 2.8eV above the Au(111) Fermi level. This investigation provides detailed structural and electronic properties of self-assembled chlorophyll-a and may be useful for the development of bio-molecular electronic devices. This work is supported by a US-DOE grant, DE-FG02-02ER46012 and Ohio University Nanobio Technology Initiative program BNNT

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