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Quartz microbalance study of photovoltaic energy balance in fullerene systems[1] BENJAMIN KELLER, ZIJIAN LIU, JACQUELINE KRIM, North Carolina State University — Energy transfer at an interface is closely linked to the topic of photovoltaic energy conversion, as well as geometries involving tip-substrate contact. To explore this phenomenon, we have employed a Quartz Crystal Microbalance (QCM) in combination with an STM for characterization of QCM oscillator amplitudes and surface morphology. With this setup we are able to detect the degree to which a temperature disparity is present between the tip (nominally at room temperature) and the sample, whose temperature can be regulated. The method provides *in situ* data, making use of the fact that QCM is extremely sensitive to abrupt changes in temperature, with literature reports of sensitivities of mK or less. Similar measurements have been performed by reflecting laser light off of QCM electrodes with a variety of coatings, to explore whether the small heating effects are also detectable and can distinguish the heat absorption of the coating. Studies have been performed on fullerenes and control sample photovoltaics, to explore the balance of the incoming light energy with overall device efficiency.

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