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Mapping the Modulus of Organic Matter in Stiff Nano-Composites across the Thermal Maturity Scale NANCY BURNHAM, Worcester Polytechnic Institute, SHANNON EICHMANN, Aramco Research Center - Boston, DAVID JACOBI, Aramco Research Center - Houston, MOHAMMAD HAQUE, Aramco Research Center - Boston — Hydrocarbons power modern economies, and energy companies are on mission to provide an inexpensive supply [1]. Most characterization of source rocks has been traditional, bulk, and destructive. Here, we characterize the organic matter in source rocks using non-destructive Raman spectroscopy and modulus mapping by atomic force microscopy [2]. Mapping the stiff organic matter in these nano-composites is challenging; the methods and assumptions will be explained. Subtle shifts in the Raman peaks are linked to sample maturity (i.e. propensity to yield oil and gas), yet no direct correlation between elastic modulus and maturity was found. However, intriguing variations across individual samples is an area of continued interest for future work. The use of micro- and nano-characterization techniques should contribute to the science behind ensuring a steady supply of the world's power. [1] M. Marder et al., *Physics Today* **69**(7), 46 (2016) [2] S.L. Eichmann et al., *submitted* (2017)

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