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**Ultrafast Vibrational Spectroscopy of Shock Compressed and Flash-Heated Single Molecular Layers**[1] CHRISTOPHER BERG, ALEXEI LAGUTCHEV[2], DANA DLOTT, University of Illinois at Urbana-Champaign — We report the shock compression and flash-heating of single molecular layers on metallic substrates probed with an ultrafast nonlinear coherent vibrational spectroscopy, vibrational sum frequency generation (SFG). Laser-driven shock compression and flash-heating resulted in pressures of a few GPa and temperatures greater than 500 K, respectively. Due to shock velocities of a few nm/ps, single molecular layers allowed picosecond time resolution of shock loading. Monolayers further allowed the measurement of heat transport from the monolayer-metal anchor point to the monolayer's terminus. SFG spectroscopy was utilized due to its sufficient monolayer sensitivity. Shock loading dynamics were analyzed with the help of static high pressure measurements in a diamond anvil cell, and flash-heating results were compared with simulations.[3,4]

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[2]Current Location: Birck Nanotechnology Center, Purdue University
[3]Y. Zhang, *et al.*, Phys. Chem. Chem. Phys. 12, 4435-4445 (2010).
[4]P. Manikandan, *et al.*, J. Phys. Chem. C 115, 9622–9628 (2011).

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