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**Kinetics studies across the melting line of metals using *dynamic-DAC*** JING-YIN CHEN, ZSOLT JENEI, HYUNCHAE CYNN, MAGNUS LIPP, WILLIAM EVANS, High Pressure Physics Group, Lawrence Livermore National Laboratory — We utilize the time-resolved synchrotron x-ray diffraction and *in-situ* optical spectroscopy to study the dynamic properties of several metals across the melting lines under different compression rates at different temperatures. The dynamic properties of metals across the pressure-induced liquid-solid transitions, such as the nucleation time and the mechanism of recrystallization are lacking. Time scales for metal nucleation and growth rates are challenging to obtain. X-ray diffraction under rapid compression will provide unique insight to understand the melting and crystallization mechanisms. In addition, the dynamical pressure changes can dramatically influence the microstructure and even phase boundaries, further affecting the properties of metals. This work was performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory in part under contract W-7405-Eng-48 and in part under Contract DE-AC52-07NA27344. This work was funded by the Laboratory Directed Research and Development Program at LLNL under project tracking code 11-ERD-046.

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