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**Kinetics of $\alpha$ to $\omega$ structural transition in zirconium** NENAD VELISAVLJEVIC, MATTHEW JACOBSEN, Los Alamos National Laboratory, STANISLAV SINOGEIKIN, DMITRY POPOV, HPCAT-Advanced Photon Source
— Zirconium (Zr), along with the other group IV-B transition metals titanium (Ti) and hafnium (Hf), has been widely investigated at high P-T conditions. Initial interest in Zr may have been driven in part by need to understand structural stability at conditions that these materials could experience in a wide range of commercial applications. Multiple studies demonstrate that, at elevated pressure, these metals and their alloys undergo a structural transition from hexagonal close-packed ($\alpha$) phase to another hexagonal ($\omega$) phase. Subsequently, $\alpha$-$\omega$ transition has been investigated in detail – results indicate that the $\alpha$-$\omega$ boundary is significantly influenced by sample purity, experimental conditions (e.g. hydrostatic vs. uniaxial compression), loading conditions (e.g. shock vs. slower "static" loading), etc. Early measurements also indicate that kinetics at the onset of $\alpha$-$\omega$ transition may play a significant role in establishing the phase boundary and thus must be fully investigated to gain a more comprehensive understanding of behavior of Zr at high P-T. Ongoing advances in large scale x-ray sources and detector and instrumentation technologies have made investigations of transition kinetics over broader P-T and compression/strain rate conditions possible. Using DAC coupled with piezoelectric and/or gas membrane loading, $\alpha$-$\omega$ transition in Zr was investigated as a function of compression (P-jump) rate. Relevant results, as well as broader impacts regarding $\alpha$-$\omega$ transition mechanism, will be presented.

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