

## Measurement of single crystal elasticity of Gold (Au) under high temperature and high pressure

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Single crystal elasticity of gold (Au) has been measure by inelastic X ray scattering method under high pressure. A few tens micrometer Au single crystal was prepared from a large commercial crystal by using FIB technique. The small crystal was placed inside a gasket hole of DAC apparatus. We succeeded to measure single crystal elasticity at 0.8 GPa and 3.2 GPa; the pressures were determined by the Ruby scale. ~100 peaks were observed at each pressure, and used to constrain the three independent constants of  $C_{11}$ ,  $C_{12}$ , and  $C_{44}$ . The resulted elastic constants are consistent with the previous data at ambient pressure.

We observed that  $C_{11}$  and  $C_{44}$  increase with increasing pressure, and  $C_{12}$  decreases with increasing pressure. We will expand the pressure range and temperature range of the measurement to establish the equation of state of gold with unprecedented accuracy.

Keywords: Gold, single crystal, elasticity, high pressure