Structural stability of binary CdCa quasicrystal under high pressure

The structural stability of a binary CdCa quasicrystal with a primitive icosahedral structure has been investigated by in situ high-pressure x-ray powder diffraction at an ambient temperature using synchrotron radiation. It is demonstrated that the icosahedral quasicrystalline structure of the sample is intrinsically stable up to 47 GPa. The bulk modulus at zero pressure and its pressure derivative of the icosahedral CdCa quasicrystal is 68.1 +/-2.0 GPa and 4.3 +/-0.2, respectively. The compression behavior of different Bragg peaks is isotropic, indicating no pressure-induced anisotropic elasticity in the stable binary icosahedral CdCa quasicrystals.