

Interfacial tension measurement of Ni-S liquid using high pressure X-ray micro-tomography

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High-pressure, high-temperature X-ray tomography experiments have been carried out using a large volume toroidal cell, which is optimized for interfacial tension measurement. A wide anvil gap, which corresponds to a field of view in the radiography imaging, was successively maintained to high pressures and temperatures using a composite plastic gasket. Obtained interfacial tensions of Ni-S liquid against Na, K- disilicate melt were 414 and 336 mN/m at 1253 and 1293 K, respectively. Three-dimensional tomography images revealed that the sample had an irregular shape at the early stage of melting suggesting that either non-equilibrium in sample texture and force balance or partial melting of surrounding silicate. This information cannot be always obtained from two-dimensional radiographic imaging techniques. Therefore, 3D tomography measurement is appropriate for the precise interfacial measurements.