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High pressure modifications of the liquid structure of the light alkaline metals GASTON GARBARINO, European Synchrotron Radiation Facility (ESRF); Grenoble; France, GUNNAR WECK, Département de Physique Théorique et Appliquée;CEA/DAM Ile de France; France, PIERRE BOUVIER, Lab. des Matériaux et du Génie Physique LMGP (CNRS/Grenoble INP); Grenoble; France, MOHAMED MEZOUAR, European Synchrotron Radiation Facility (ESRF); Grenoble; France — The alkali group elements are considered as textbook examples of free-electron metals because of the single s electron in the valence band. However, when these metals are subjected to compression they exhibit unexpected complexity suggesting extraordinary liquid states at extreme conditions. The analysis of the liquid structures of the light alkali metals has not been completed because of the lack of experimental data. Only X ray diffraction (XRD) data at room pressure are available. The major difficulty with liquid diffraction at high pressure is the large scattering background signal generated by the diamond anvil cell giving a signal over background ratio of around only 1 to 5 per cent. All these points explain the lack of experimental data of liquid alkali metals at high pressure. We performed the first quantitative measurements of the liquid structure factor of light alkali metals up to 100 GPa using XRD. We explored the P-T diagram in order to obtain quantitative structure factor, radial-distribution function and density of liquid alkali metals up to 100 GPa. We confirmed the existence of a different liquid structure at the minimum of the melting curve compared with the one at room pressure.

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