High-pressure single-crystal diffraction at the Advanced Light Source: A tale of two subduction zone mineral phases

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High-pressure single-crystal diffraction techniques are being actively developed at beamline 12.2.2 of the Advanced Light Source, Berkeley CA. This technique has been pursued by augmentations in two different directions: (1) improved data collection, and (2) streamlined data processing. Processing of single-crystal data is a daunting task, and we will briefly discuss the programs that are used for data processing from peak harvesting all the way to structure refinement. High-pressure single-crystal experimental results from two subduction zone mineral phases will be discussed. Lawsonite ($CaAl_2Si_2O_7(OH)_2 \bullet H_2O$) has been studied up to ~10.0 GPa using a 4:1 methanol:ethanol mixture as the pressure medium, and dravite tourmaline ($NaMg_3Al_6(Si_6O_{18})(BO_3)_3(OH)_3OH$) has been studied up to ~22.6 GPa using Ne as the pressure medium (loaded at the ALS). These results include the first single-crystal solution of the high-pressure phase of lawsonite, which will be discussed.