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Six crystals of silicate spinel, a high-pressure mineral abundant in the transition zone of Earth's mantle, confined in a diamond-anvil cell (mount diameter, 0.45 millimeter). High-pressure x-ray studies of these crystals reveal that the Mg$_2$SiO$_4$ end member is 13% more compressible than the Fe$_2$SiO$_4$ end member even though its molar volume is 6% less. Such anomalous compressibility suggests that the behavior of Mg$^{2+}$ and Fe$^{2+}$ at mantle pressures is divergent. See page 206. [Photo: R. M. Hazen]