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Ideal Shear Strength of Silicon Under Hydrostatic Tension and Compression ARI KAY, University of California, Berkeley, D. C. CHRZAN, University of California, Berkeley and Lawrence Berkeley National Laboratory — The ideal shear strength of silicon is computed using an *ab-initio* electronic structure total energy technique applying both hydrostatic tension and compression. Silicon displays a lower ideal strength under hydrostatic compression as compared with hydrostatic tension. This behavior is explained by silicon's desire to retain a more covalent like bonding under hydrostatic tension as compared with a more metallic like bonding under hydrostatic compression. The trend may be correlated with the shrinking of the band gap under the application of hydrostatic compression as compared with the gap predicted under hydrostatic tension. This research was supported by the Department of Energy, Basic Energy Sciences under the Office of Science under contract DE-AC03-76SF00098.

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