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FREE ATOM CORE BINDING ENERGIES OF CALCIUM, STRONTIUM AND BARIUM FROM X-RAY PHOTOELECTRON SPECTROSCOPY

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The technique of photoelectron spectroscopy applied to gaseous systems provides a direct, unambiguous measurement of core binding energies. For most atomic species accurate binding energies have only been measured for valence levels. The experimental situation with regard to core levels is quite unsatisfactory since only a few atoms other than the rare gases have been studied.

Core level x-ray photoelectron spectra of calcium, strontium, and barium, have been obtained. These provide the first accurate x-ray photoelectron spectroscopic measurements of the core binding energies of these elements. Other experimental and theoretical values from literature are compared with the present results.

The free atom binding energies are found to be greater than the comparative solid state binding energies. The experimental ' phase transition shifts ' are compared with various theoretical estimates.