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A Career in Thermodynamics

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Deeply appreciative of the symposium in my honor. I take this opportunity to present my science in the context of other scientific and societal events of the past five decades. In geochemistry I have utilized high-temperature oxide melt solution calorimetry to provide thermodynamic data and, more importantly, scientific insights into the microscopic sources of stability and metastability in spinels, high-pressure minerals, silicate glasses and melts, hydrous minerals and nanomaterials. In materials science I have studied the thermodynamics of ceramic, nuclear, and energy-related materials. Often the geochemical and materials projects are overlapping and synergistic. In this talk I highlight examples of my findings, roughly one per decade, that proved long-lived and transformational. However, my most important “product” may be the many students, postdocs and colleagues who have influenced me and been influenced by my ideas. I have seen the societal reasons and patterns for doing science evolve. Geochemistry is now more exciting than ever, especially in the broader planetary context. while materials science is rapidly discovering new materials which require fundamental understanding. Improvements in experimental and computational approaches promise future advances on both fundamental and applied fronts; thermodynamics remaining crucial to both science and technology.