Piezonuclear Fission Reactions Simulated by the Lattice Model

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Abstract

Recent experiments conducted on natural rocks subjected to different mechanical loading conditions have shown energy emissions in the form of neutrons and anomalous chemical changes ("piezonuclear fission"). In the present study, we have used a numerical technique to simulate the anomalous nuclear products of piezonuclear fission. Specifically, the reactions were simulated by means of a nuclear lattice model that assumes that nucleons are ordered in an antiferromagnetic face-centered-cubic (fcc) array. The simulations indicate that small and middle-sized nuclei can be fractured along weakly-bound planes of the lattice structure. We argue that the simulations provide theoretical support for the experimentally-observed reactions and, moreover, that the probabilities calculated for various low-energy fission phenomena can be used to explain the stepwise change in abundance of elements in the Earth's crust, which is known to have evolved from basaltic to sialic composition over geological time.