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LETTER

Earth's "missing" minerals

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ABSTRACT

Recent studies of mineral diversity and distribution lead to the prediction of >1563 mineral species on Earth today that have yet to be described—approximately one fourth of the 6394 estimated total mineralogical diversity. The distribution of these "missing" minerals is not uniform with respect to their essential chemical elements. Of 15 geochemically diverse elements (Al, B, C, Cr, Cu, Mg, Na, Ni, P, S, Si, Ta, Te, U, and V), we predict that approximately 25% of the minerals of Al, B, C, Cr, P, Si, and Ta remain to be described—a percentage similar to that predicted for all minerals. Almost 35% of the minerals of Na are predicted to be undiscovered, a situation resulting from more than 50% of Na minerals being white, poorly crystallized, and/or water soluble, and thus easily overlooked. In contrast, we predict that fewer than 20% of the minerals of Cu, Mg, Ni, S, Te, U, and V remain to be discovered. In addition to the economic value of most of these elements, their minerals tend to be brightly colored and/or well crystallized, and thus likely to draw attention and interest. These disparities in percentages of undiscovered minerals reflect not only natural processes, but also sociological factors in the search, discovery, and description of mineral species.

Keywords: Mineral diversity, nickel, sodium, tellurium, mineral ecology, mineral evolution, chance vs. necessity, philosophy of mineralogy, sociology of mineralogy