On the mineralogy of the Anthropocene Epoch

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Do humans play a significant role in Earth's recent mineral evolution? In the earlier analyses of Earth's changing mineralogy through deep time [*1-5*] the influences of human activities received only peripheral mention. The 10 stages of mineral evolution proposed by Hazen et al. [*4*] relate only to natural (i.e., pre-technological) physical, chemical, and biological processes. Nevertheless, questions related to human influences on Earth's mineralogy are of potential interest and importance. Are we now in "Stage 11"—a time when mineral diversity and distributions are experiencing a punctuation event owing to the pervasive impact of human activities on Earth's near-surface environment?

Though yet to be confirmed by the International Union of Geological Sciences, there is growing advocacy for formal recognition of a post-Holocene "Anthropocene Epoch" to characterize the time within the Quaternary Period when human activities began to have a significant effect [*6*]. Anthropogenic inorganic mineral-like compounds include both (1) purposely synthesized, e.g., compounds in cement, metal alloys, carbide abrasives, laser crystals, and battery components, and (2) formed inadvertently though human activities, such as incrustations in mines and pipes, corrosion phases on ancient artefacts, and combustion by-products. Some of the latter had been approved as valid minerals by the IMA Commission before a rules change. Anthropogenic compounds are likely to be preserved as distinctive stratigraphic markers far into the future [*7*].

1. Zhabin (1979) Dok. Akad. Nauk 247, 199-202; 2. Yushkin (1982) Zap. Vses. Mineral. Obs. 116, 432-442; 3. Hazen et al. (2008) Am. Mineral. 93, 1693-1720; 4. Hazen & Ferry (2010) Elements 6, 9-12; 5. Krivovichev (2013) Min. Mag. 77, 275-326; 6. Waters et al. (2016) Science 216, 6269-137; 7. Zalasiewicz et al. (2013) Geol. Soc. Spec. Pub. 395, 109-117.