

Democratizing Science and Accelerating Discovery with Curated Reference Materials

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The space race of the 1960s prompted heavy investment into federal science in the US, including the development of standards for analysis of lunar samples. In the early years of electron microprobe, there were few mineral standards, but great demand. Smithsonian curators launched a campaign to characterize minerals and synthetic compounds of suitable availability and homogeneity by wet chemistry. The museum's collections were an obvious source of raw material. Decades of work resulted in 31 reference materials that are loaned weekly, free of charge, to laboratories around the globe [1]. The benefit to science exceeds the obvious gains in efficiency. Common reference materials allow us to quantify and minimize interlaboratory bias. Institutionally managed collections promise long-term preservation and offer practitioners -- regardless of career stage, institutional wealth, or cronyism -- the opportunity to engage in world class research. Even self-interested researchers should see the benefit of contributing to institutionally managed collections. You don't lose access, but you outsource time-consuming management and ultimately augment your own stature and citations.

My presentation will celebrate some of the many reference materials held by the Smithsonian [e.g. 1-5] and offer a vision for the future.

Goldschmidt, Newton & Einstein (2007), *Nature* 25, 1888-1947.

[1] Jarosewich et al., (1980), *Geostandards Newsletter*, 4 (1), 43-47

[2] Kumamoto et al. (2017), *American Mineralogist*, Volume 102, pages 537-547

[3] Cottrell et al. (2009), *Chemical Geology* 268.3-4: 167-179.

[4] Holycross and Cottrell, (2023), *Science*, 2023380.6644: 506-509.

[5] Moussallam et al., (2024) *Geostandards and Geoanalytical Research* 48.3: 637-660