
BACKGROUNDER

The Company

The work of Materialytics, LLC began in 2002 as an academic research project to determine the provenance of gemstones, given only the stones themselves. The results of that work were transferred to a privately held company in 2007 for further research and development. In 2013, the company started commercial application of the work.

What the Company Does

Materialytics, LLC. has developed new technology for the rapid identification, classification, and authentication of virtually any materials, based on the observation that every material, natural or man-made, bears unique traces of its origin and history. This technology detects those minute traces in a 40,000+ dimensional space, allowing comparison of thousands of variables. Analyses require minutes, and are conducted by technicians rather than scientific experts.

While documentation can be falsified, “the material certifies itself.”

Applications

Three commercially important applications for the Materialytics Analysis Process are currently being developed:

Counterfeit Materials Detection: Verifying authenticity in industries from aerospace to pharmaceuticals.

Quality Control: Testing materials throughout the supply chain; testing parts throughout manufacturing.

Conflict Mineral Identification: Tracking minerals, e.g. Tin, Tantalum, Tungsten, and Gemstones to their mines of origin.

The MAP can answer such questions as:

Does this steel meet our specifications? Who made it?

Are these rubies natural or synthetic? If natural, where were they mined?

Are these pharmaceuticals really from the source indicated on the package?

“Other” Applications have been studied briefly. For example, coffee beans are often “fair-traded” for various reasons including concern over child labor. Pilot studies coffee and other foods and commodities indicate that the MAP can reliably classify these materials.

A Simple Concept

The MAP compares a sample of unclassified material with a large number of well-documented materials to determine which known group the unclassified sample best matches.

What's Hard About This

The similarities and differences between materials are often tiny, numerous, and not known. The amount of data available from analytical instruments is immense, but traditional chemical and physical analysis ordinarily discards “unimportant data” and “noise” (often 99% of the signal available) in order to reduce the needed data processing to a practical level. Nobody really knows, among thousands of variables, what is important and what is not, greatly limiting the accuracy of results. Analysis has always relied upon human expert opinion. The hard part of Materials Characterization has been in figuring out how to get objective results from more data than anybody can understand.

The MAP discards nothing, using a process called Quantageneticssm to process everything with readily available resources. No human opinion is required at any point.