

## FACT SHEET

### 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.

### Headquarters

Killeen, TX

### Press Contact

Nels Winkless  
N.Winkless@materialytics.com  
254-226-9639

### New Technology

Quantagenetics<sup>®</sup> is a new, proprietary analytical technology, developed by Materialytics and is the purest form of authentication for a variety of natural and industrial materials. Quantagenetics<sup>®</sup> definitively determines the authenticity and characteristics of any material, using only the material itself without reliance on documentation or conventional analysis. The technology is rapid (seconds), highly accurate (greater than 97.7% across all materials), low cost in a production platform, and removes only a few cubic microns of material to classify an unknown sample.

### Application of the Technology

The technology does not require human judgment nor does it rely on additives or markers to verify that a material is genuine. Quantagenetics<sup>®</sup> allows materials to reveal their own stories. The technology is best described as “DNA analysis,” as it provides insights into a material’s origin and traits, just as analysis of DNA does for living creatures. Fundamentally, the technology compares thousands of variables (containing atomic, isotopic, molecular, and structural information) represented by an unknown material’s spectrograph to a database of known spectrographs. The possible classifications are binary, (1) the unknown material’s spectrograph is not in the database, or (2) the unknown material’s spectrograph matches a signature in the database with high accuracy identifying it with a known material. Quantagenetics<sup>®</sup> allows materials to reveal their unique characteristics accurately by:

- Distinguishing a genuine article from a counterfeit (electronic component, medicine tablet, gemstone);
- Revealing if a material has missed a treatment (metal alloys, ceramics, additive materials);
- Pinpointing the origin of raw materials such as conflict minerals tin, tantalum, tungsten, or gold (distinguishing between emeralds from mines just 200 meters apart as well as on different continents and distinguishing between natural and synthetic diamonds to include distinguishing between different manufacturers).

*(The tables on the next page show the results of some of Materialytics internal pilot studies.)*

## Value of the Technology

Quantagenetics® is disruptive and a game changer in a number of industries and once implemented, will yield a high ROI. It allows rapid analysis of materials with minimal sample preparation, making it a useful first line screening tool to determine if further analysis is required. Significantly, it will serve as a back-up for, or replace “bag and tag” programs. Without relying on human judgment subject to mistakes or bad faith, the material certifies itself.

Any new technology can be hard to accept, because, while the concepts may be clear and sensible, it is difficult for organizations to implement new ideas, even with compelling evidence supporting change. Quantagenetics is one of those technologies, Materialytics’ founders have successfully commercialized disruptive technologies several times in the past, creating world standards. They intend Quantagenetics to become another new standard as well.

### Example Small Pilot Studies With Quantagenetics®

#### Steel Alloys - Detecting Heat Treatments: average accuracy is 97.8%

Material: 17-4 Steel	Number of Samples	Accuracy
Condition A	30	96.7%
HP 1150	30	98.9%
HP 900	30	97.8%

#### Acetaminophen – Brand Identification: average accuracy is 98.2%

Brand	Dosage	Number of Samples	Accuracy
Equate	500mg Caplets	30	99%
Quality Plus	500mg Caplets	30	97%
McNeil Healthcare (Tylenol)	500mg Caplets	30	99%
McNeil Healthcare (Tylenol)	500mg Caplets	30	98%
Equate	500mg Caplets	30	98%

Conflict Minerals  
 –

#### Provenance Identification: average accuracy is 96.9%

Material	Number of Samples	Number of Locations	Mine of Origin Accuracy
Cassiterite	180	6	90.7%
Columbite-Tantalite (Coltan)	210	7	98.7%
Gold	90	3	100%
Wolframite	90	3	98.5%

**Gemstones – Provenance Identification: average accuracy is 97.9%**

<b>Material</b>	<b>Number of Samples</b>	<b>Number of Locations</b>	<b>Mine of Origin Accuracy</b>
Diamond	359	10 + (2) synthetic sets	97.9%
Emerald	300	10	98%
Ruby	690	23	98%
Sapphire	510	17	98%
Tourmaline	210	7	98%

These results may be covered under US Patents 9,063,085 and 8,699,022. Materialytics, Quantagenetics, and M2S are registered trademarks.