intellegens

Applied machine learning

Data-driven design and development of Materials

Design materials, gaining insight into what controls properties

Optimise process parameters and ensure production quality

Focus experiment, achieving better results; typical reductions of 50-80% in testing

**Extract value from sparse, noisy experimental and process data**

Analysing property data in the Alchemite™ Analytics user interface

Materials teams want to find new or improved metals, plastics, composites, or ceramics that outperform existing solutions or fill gaps in the market. They do a lot of expensive experiment, testing, and simulation to identify the best candidates. Can they get there faster at lower cost per material?

With Alchemite™ machine learning, you can use the data you have to design new and improved materials, optimise processes, and more effectively target testing.

Because this data comes from diverse sources and tests, it tends to be 'sparse', causing problems for conventional machine learning. Alchemite™ is designed to handle sparse, noisy data, and to work for problems with multiple target parameters. It's ideal (and proven) for materials design.

Alchemite™ originated at the University of Cambridge, applied to design of aerospace alloys in collaboration with **Rolls-Royce**. Now developed and supported by Intellegens, it has been successfully used to overcome R&D challenges in metals, polymers, composites, ceramics, additive manufacturing, formulated products, surface treatments, and more.
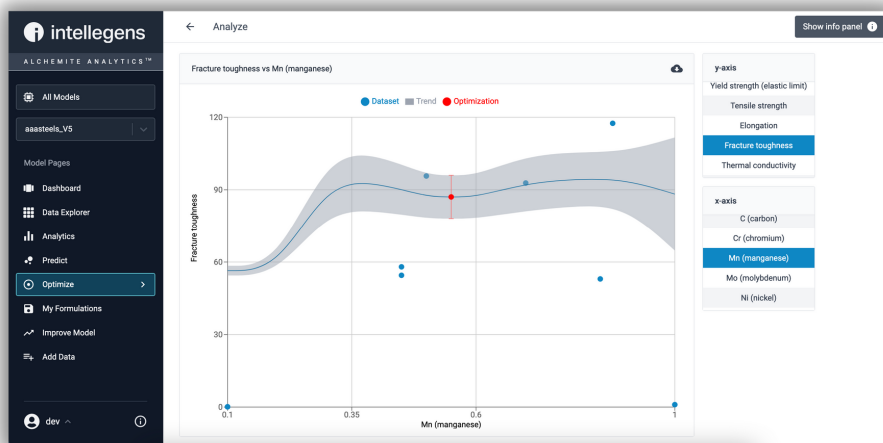
The Alchemite™ Analytics platform provides scientists with quick, easy access to advanced deep learning methods and powerful graphical analytics via a web browser user interface.

Case studies (more at intellegens.com/casestudies)

NASA Glenn Research Center validated Alchemite™ for the design of shape memory alloys and heat exchangers, reducing time and cost associated with experimental measurements.

OCAS NV Research Centre (a joint venture of ArcelorMittal) applied Alchemite™ to real-world steel applications, providing insights that help to improve steel properties and focus experimental resources.

Lucideon uses Alchemite™ in its work on ceramics, polymers, and controlled release technologies, enabling better decisions on its use of experiment and simulation.

The AMRC has applied Alchemite™ to optimise additive manufacturing (in collaboration with **Boeing**, **Constellium**, and **GE Additive**) and to reduce testing costs and wastage in composite tooling.

Alchemite™ for materials design and development

With the **Alchemite™ Analytics** software, materials scientists and materials engineers can apply powerful deep learning methods through an easy-to-use web browser interface. **Alchemite™ Engine** gives data scientists flexible API access to the full power of the Alchemite™ algorithm, enabling them to integrate it with in-house systems and workflows. Key features are:

- Gap-fill and validate sparse, noisy data from suppliers, experiment, simulation, and production
- Auto-generate models that identify key relationships within your data
- Quantify uncertainty to support a rational business case for key decisions
- Suggest what experiment(s) to do next, increasing the efficiency of experimental programs
- Identify the optimal composition and processes for your material
- Propose optimised process parameters to improve quality and performance.

Next steps

Contact us to book a demo tailored for your application. Visit our website to download white papers and subscribe to our newsletter. Or follow us on social media.

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