Machine learning for Materials R&D

Data-driven design of materials and processes

In total it gives us nearly **40% cost savings** in manufacturing and testing

Voestalpine gained insight into AM alloy development

Design advanced materials, gaining deep insight into what controls properties

Optimise products and process, responding to market and regulatory requirements

Focus experiment and testing, achieving better results with 50-80% less time and cost



Analysing property data in Alchemite[™]

Materials teams want to find new or improved metal alloys, plastics, composites, or ceramics that outperform existing solutions or fill gaps in the market. They do enormous amounts 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 put your experimental and process data to work, generating and applying models that enable you design new and improved materials, optimise processes, and target your testing programs more effectively.

The Alchemite[™] Suite software offers unique capabilities:

- A series of easy-to-use task-focused apps make machine learning (ML) quick and easy to apply while supporting collaboration across teams.
- Based on the powerful Alchemite[™] method, it generates ML models from real, sparse, noisy, experimental and process data - where other methods often fail.
- It's built on and supported by experience from hundreds of R&D projects - Alchemite[™] is proven for materials R&D.

The Alchemite[™] method originated at the University of Cambridge, where it was first applied to design aerospace alloys in collaboration with **Rolls-Royce**. Developed and supported by Intellegens since 2017, it has been successfully used to overcome R&D challenges in metals, polymers, composites, ceramics, additive manufacturing, formulated products, surface treatments, and more.

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Alchemite[™] provides scientists with quick, easy access to advanced machine methods and powerful graphical analytics via a series of easy-to-use apps.

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 helped to improve steel properties and focus experimental resources.

Lucideon used 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[™] Suite

Alchemite[™] offers a suite of easy-to-use apps, each focused on a key R&D challenge. Give the right app to the right team member, speeding and informing their work. Then share results and collaborate across your team, creating an integrated machine learning solution for materials R&D.

	Alchemite [™] Viewer	Share and view results, enabling collaboration and decision-making.
	Alchemite [™] Explorer	Quickly generate models, test hypotheses, explore key relationships.
A	Alchemite™ Designer	Set up and run Design of Experiments projects in a few button clicks.
A	Alchemite [™] Innovator	The complete ML toolkit to support materials design and development.
A	Alchemite [™] Architect	API access to integrate and automate powerful ML.

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