UNIVERSITY OF CAMBRIDGE

intellegens

Machine learning for sparse data

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CTO

Alchemite™ machine learning for sparse data

Typical experimental data is sparse but Alchemite™ extracts more information than other machine learning approaches

Design optimal industrial formulations

Accelerate the research & development processes from 10 to 1 years

Reduce costs from $20 million to $1 million

Problem statement from GKN

GKN seek a heat exchanger to serve as a structural component in an aircraft and is additive manufactured

Intellegens will design the titanium alloy composition with high thermal conductivity without reducing the mechanical properties

Alchemite™ machine learning

Al

V

Fe

C

N

O

0.2% YS

UTS

Area reduction

log(Cyclic life)

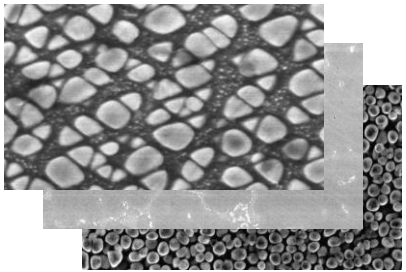
Conductivity

Optimized alloy

Al		6.49%
V		3.99%
Fe		0.19%
C		0.01%
N		0.04%
O		0.17%

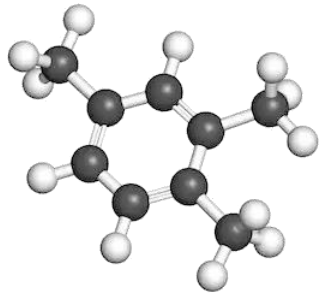
0.2% YS /MPa	844
UTS /MPa	953
Area reduction /%	32.9
log(Cyclic life)	4.52
Conductivity /$Wm^{-1}K^{-1}$	6.59

Other sparse data design projects



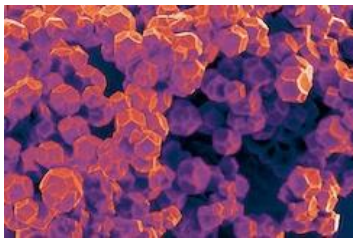
Nickel and moly alloys

Batteries



Lubricants

Steel for welding



Metal-organic framework

Concrete

Steel for turbos

Drug design

Further applications in the ATI-Boeing accelerator

Aerospace applications

Alloys for additive manufacturing
Battery materials
High temperature alloys for engines
Composite materials
Advanced lubricants and fuels

Sparse data applications - post COVID-19

Effective and focused passenger screening
Prediction of future infection rates (underway with Richard Nixon Foundation)

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