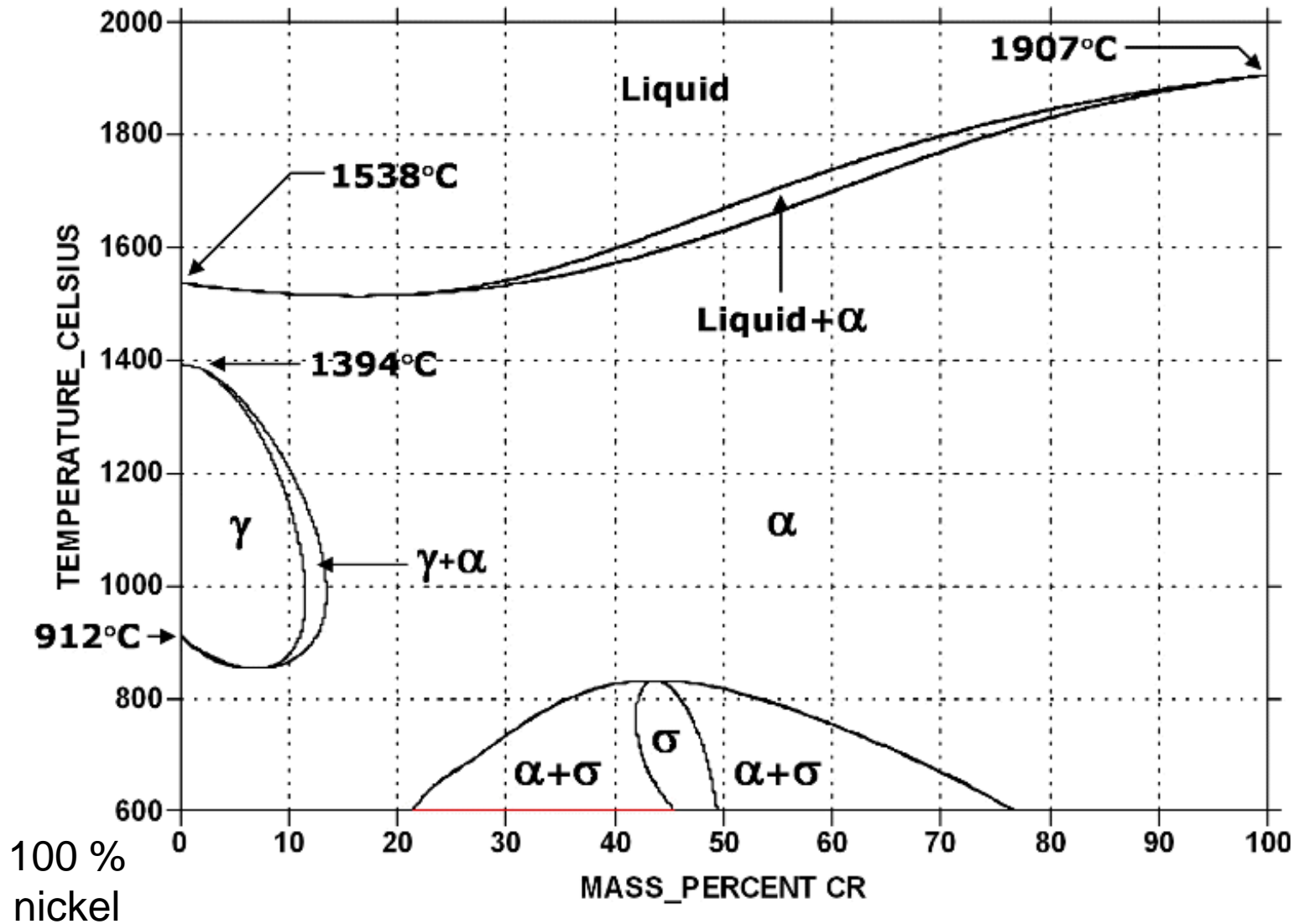


# **Materials Development to Enable AM Technology**

## **AM Technology to Enable New Materials**



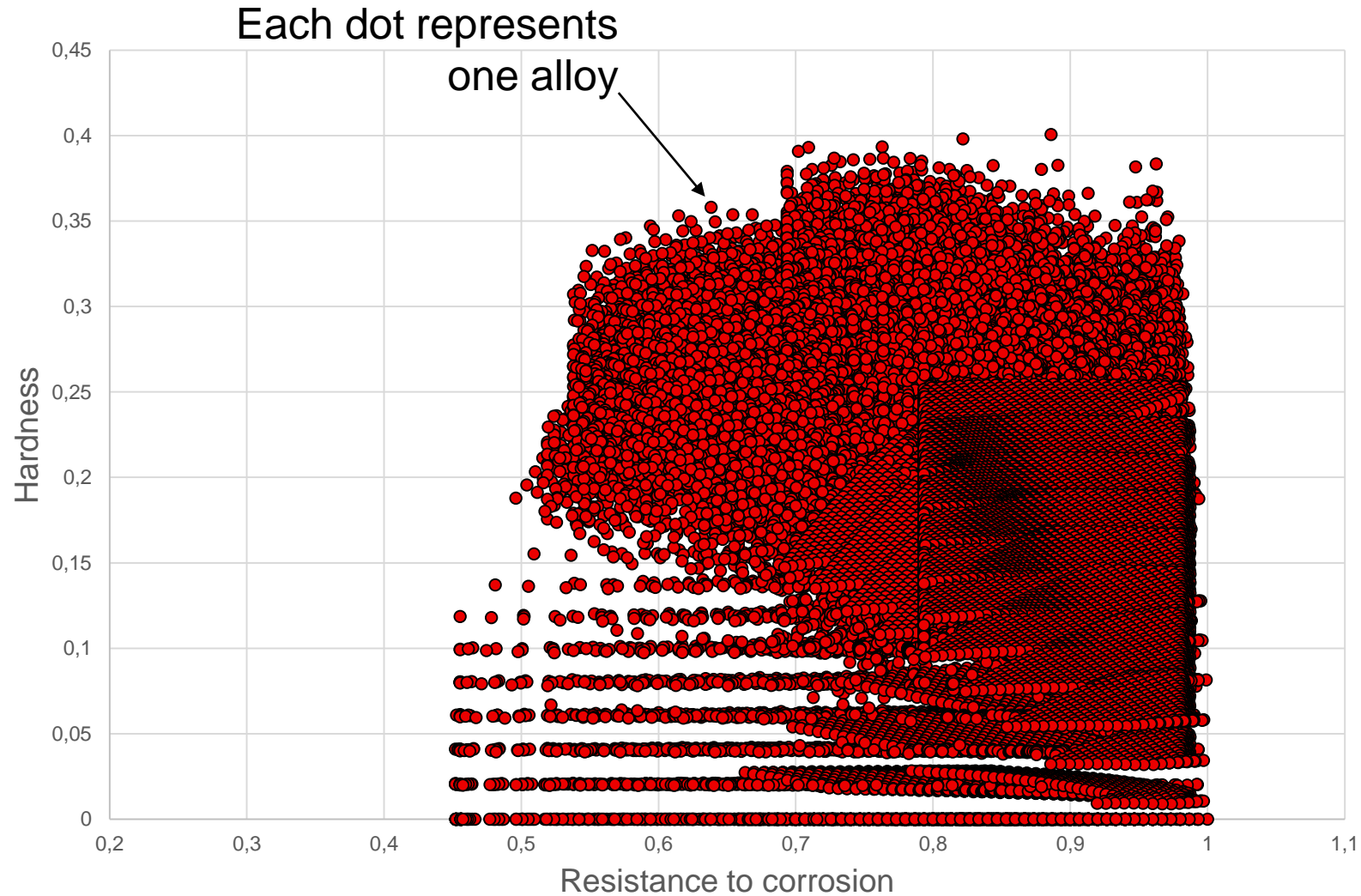
# The Old 2D World



Today's tools of  
innovation

2D

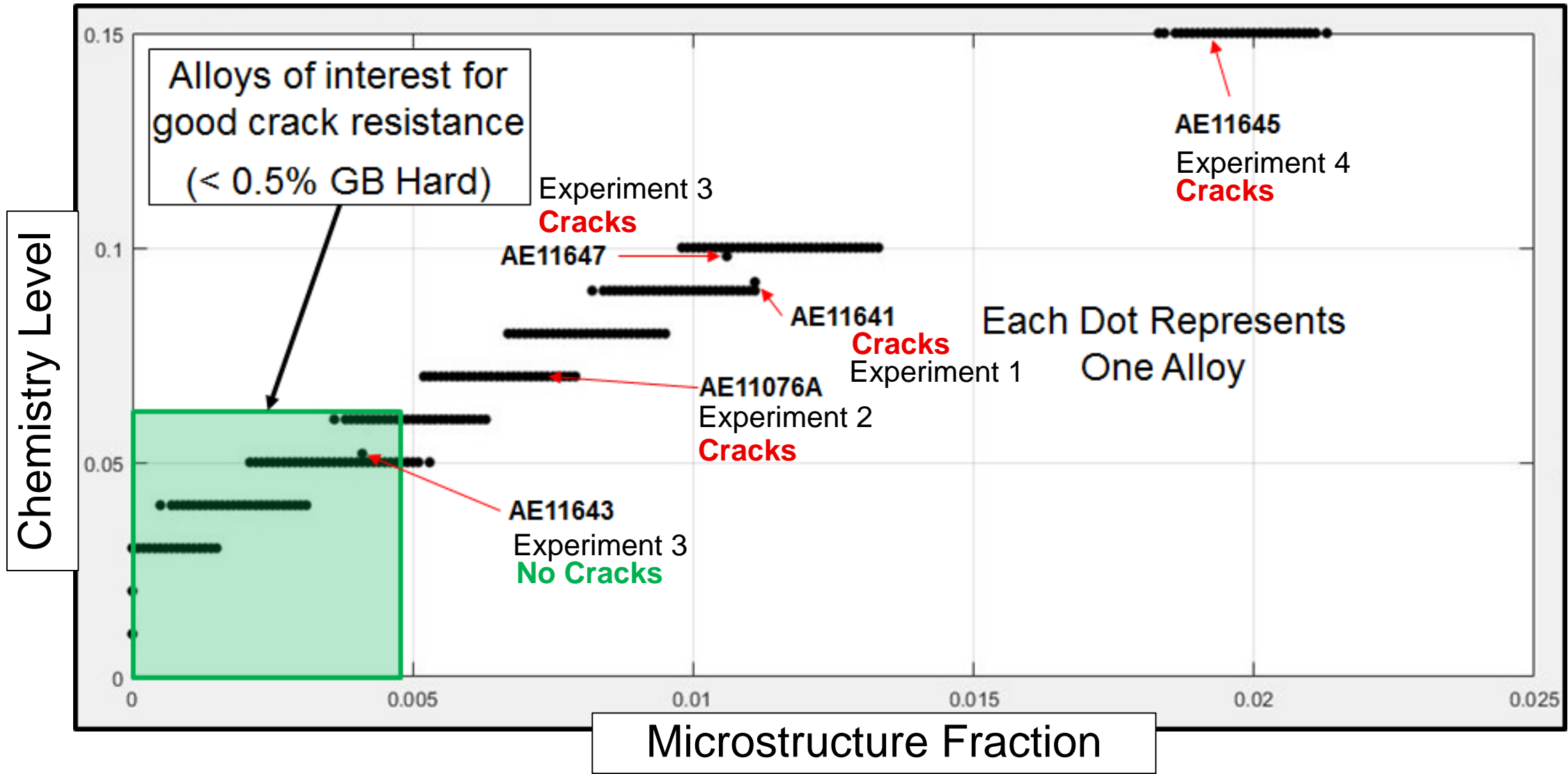
# Oerlikon Uses Tomorrow's Tools of Innovation



Innovating in  
infinite dimensions



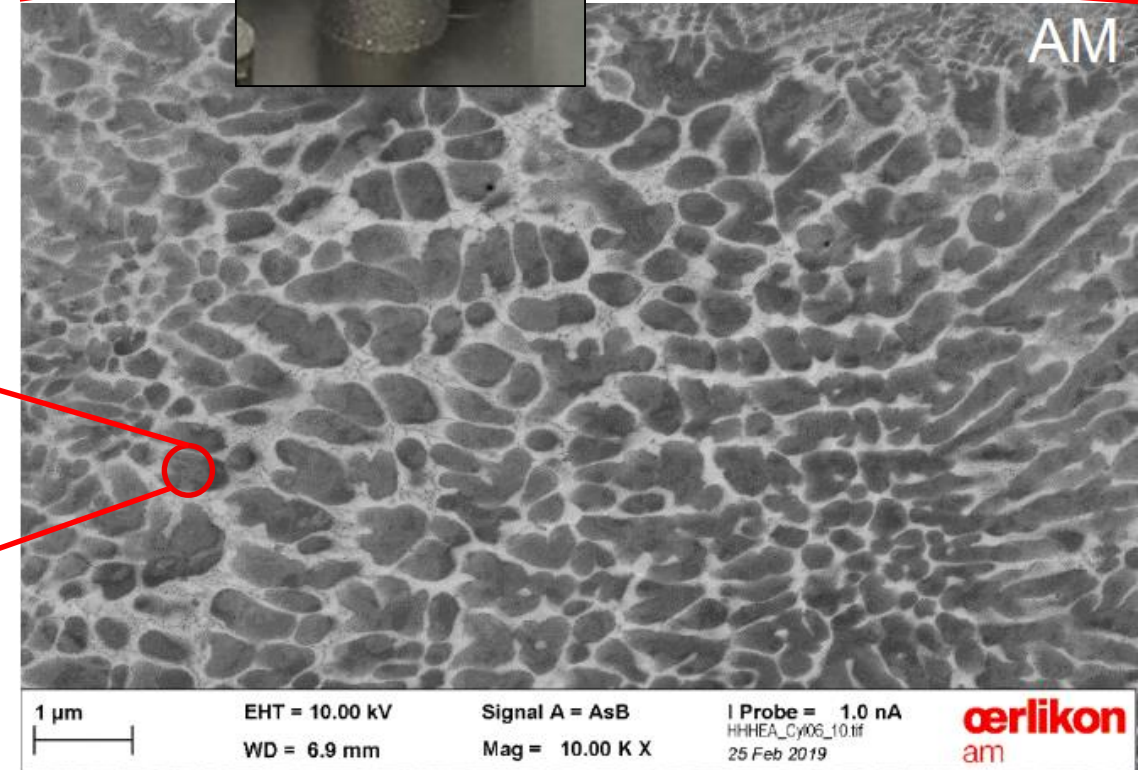
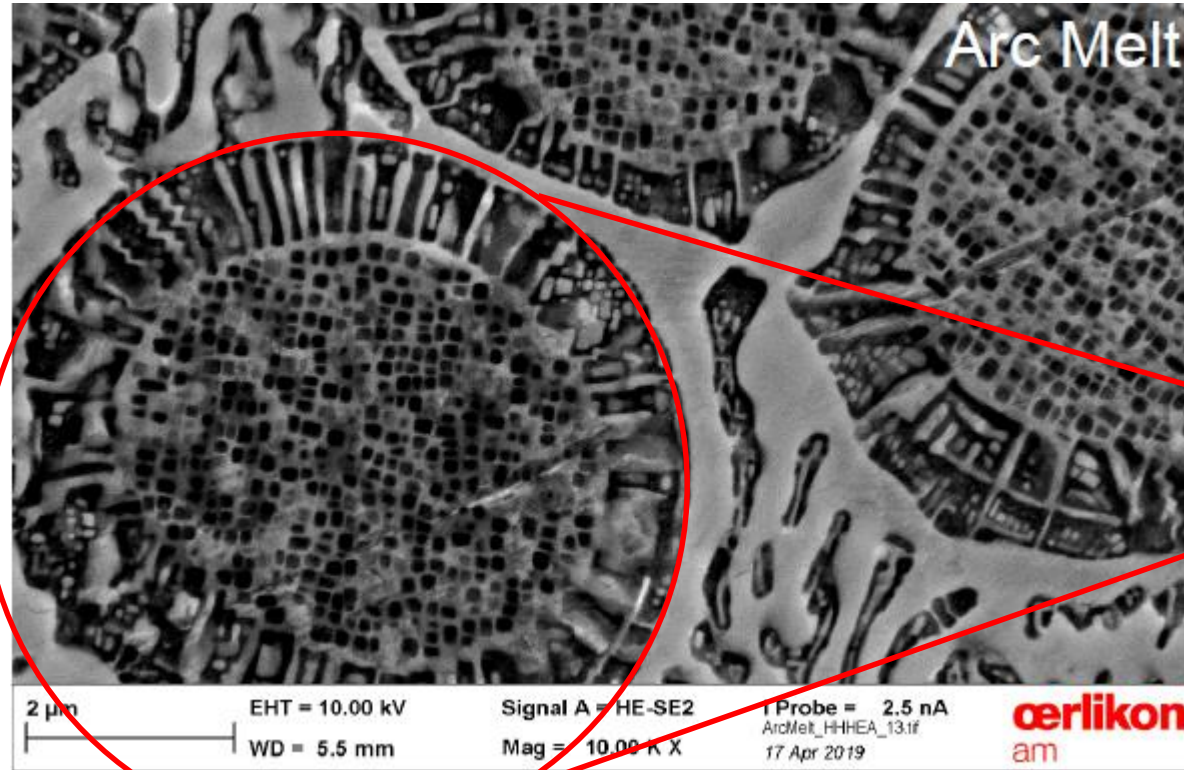
# Enabling AM with New Materials



The Scoperta technology has assisted in determining the role of cracking in Haynes 230 and how to adjust chemistry to avoid it.

# AM Technology to Enable New Materials

Zoomed in  
10,000X

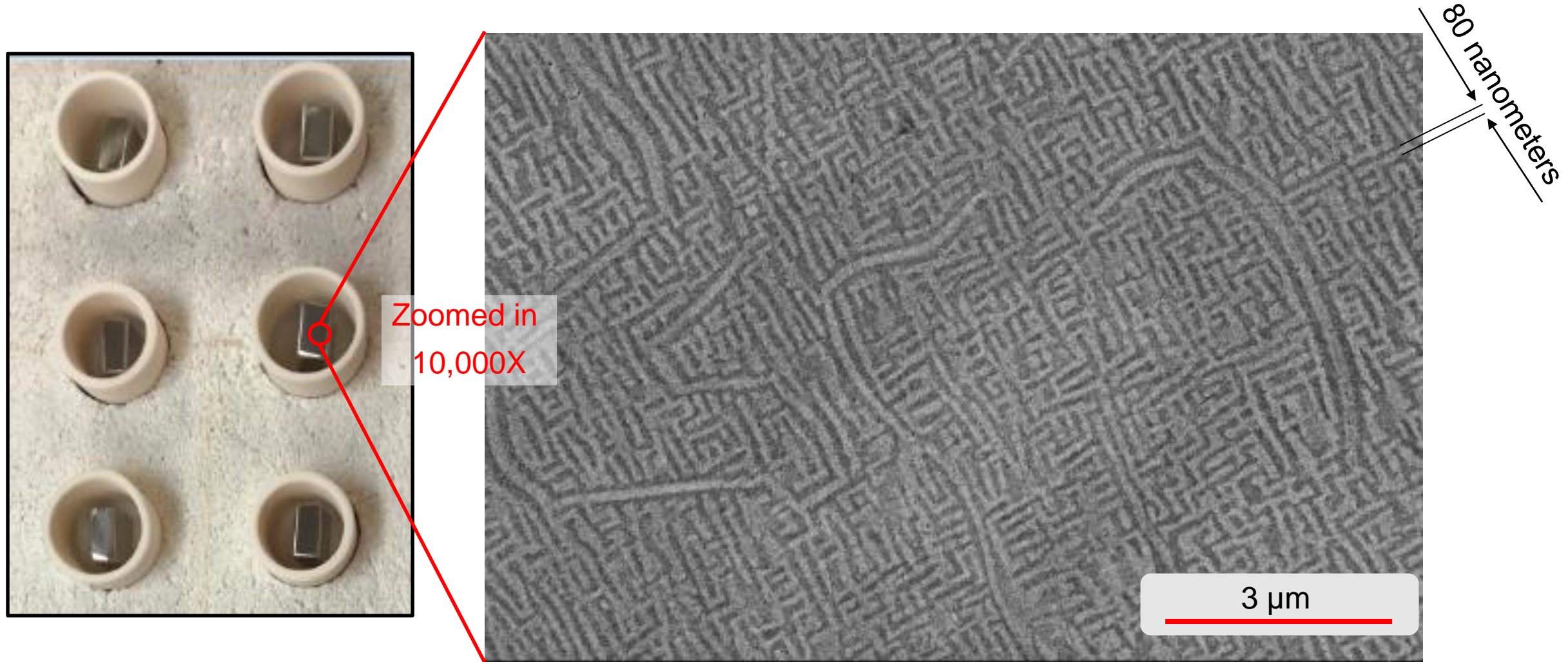


Conventional Processing: Large Particles

Additive Manufacturing: Small Particles

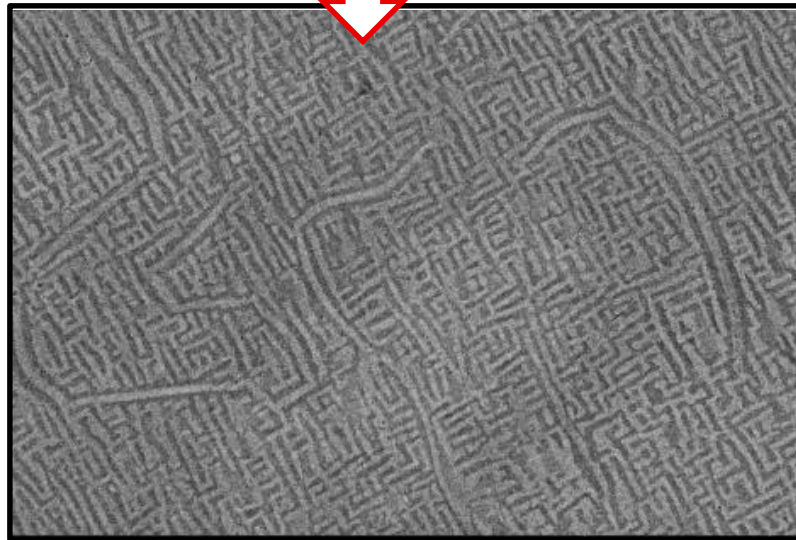
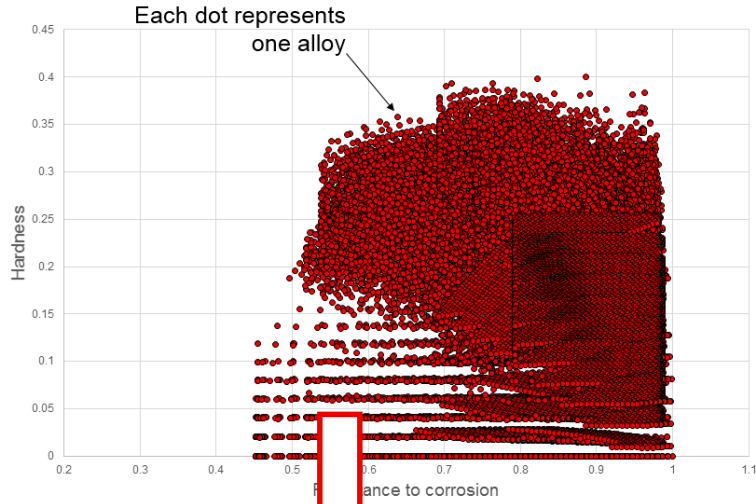
Small Particles = Stronger & Tougher Materials

# In Pursuit of 'Small' Microstructures



This structure enables resistance to high temperatures

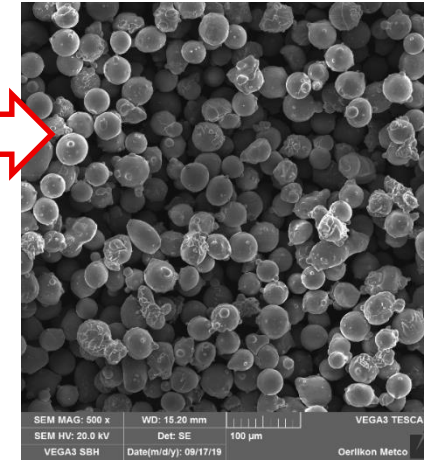
# Creating Real Parts



1) Alloy Design



2) Powder Manufacturing



3) Part Manufacturing

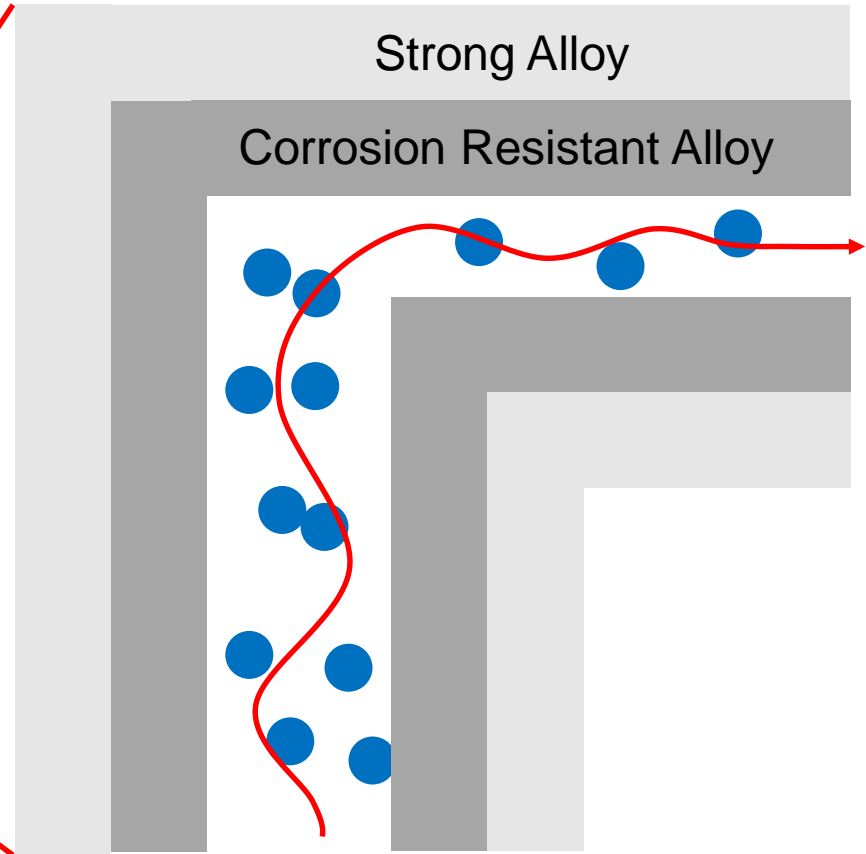


Developing the Next Generation AM Products will Require All 3 Steps

# Manufacturing Parts: An Example of RAD and AM Providing Unique Value



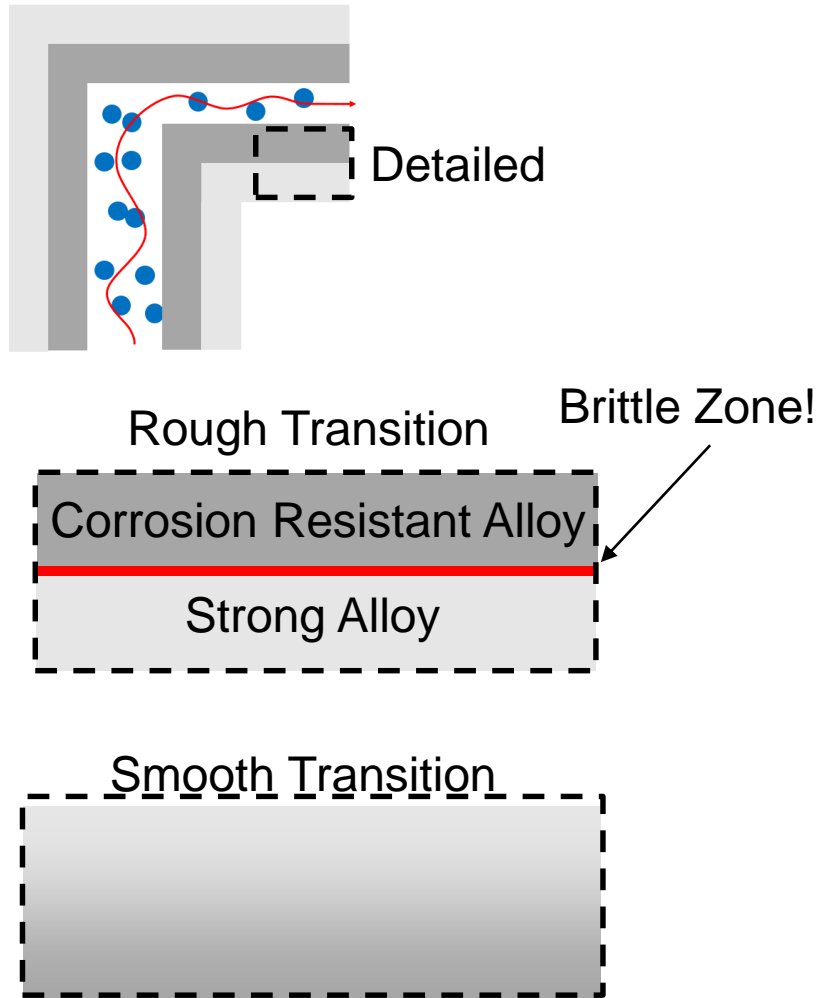
Subsea Components



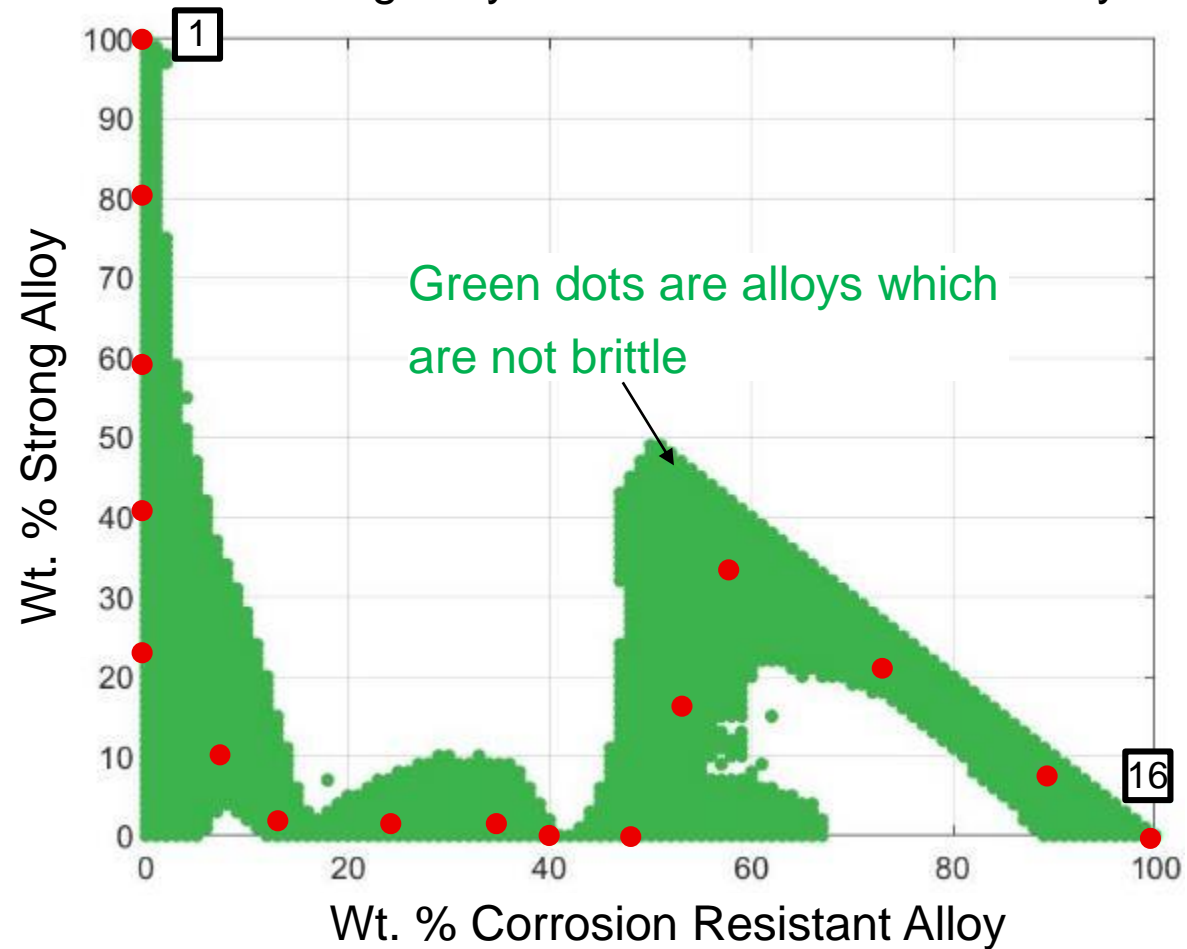
High Pressure  
Highly Corrosive Liquid



# Manufacturing Parts: An Example of RAD and AM Providing Unique Value



10,000 alloy modelled to identify optimum alloy path between strong alloy and corrosion resistant alloy



In multi-alloy parts RAD can help