Localized corrosion initiation in LBE environment

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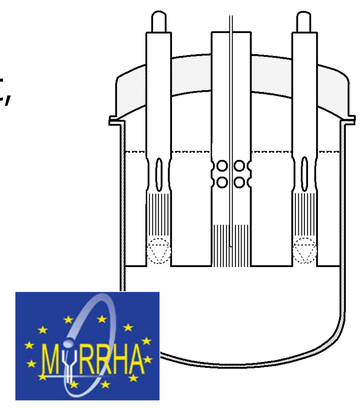
1. RESEARCH CONTEXT

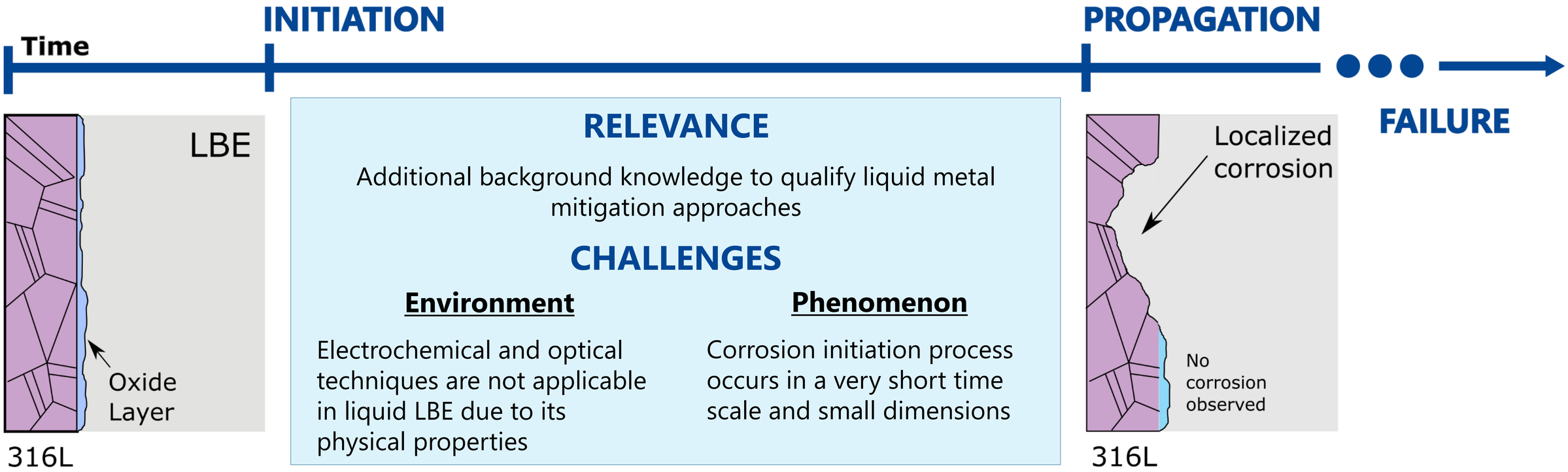
In the framework of MYRRHA project, liquid metal corrosion is one of the concerns regarding environment degradation of selected structural materials



OBJECTIVES

Develop a methodology to characterize localized corrosion initiation mechanisms on austenitic steels in a heavy liquid metal environment

CORROSION PROCESS



RELEVANCE

Additional background knowledge to qualify liquid metal mitigation approaches

CHALLENGES

Environment

Electrochemical and optical techniques are not applicable in liquid LBE due to its physical properties

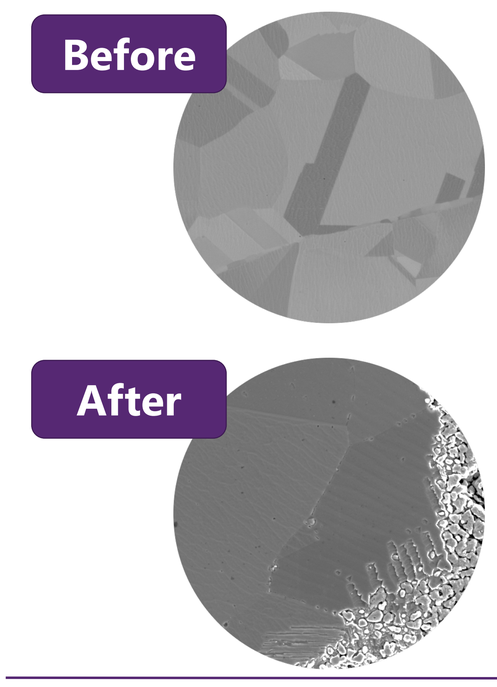
Phenomenon

Corrosion initiation process occurs in a very short time scale and small dimensions

2. EXPERIMENTAL APPROACH

EX-SITU

Observation of the surface before and after exposure in LBE



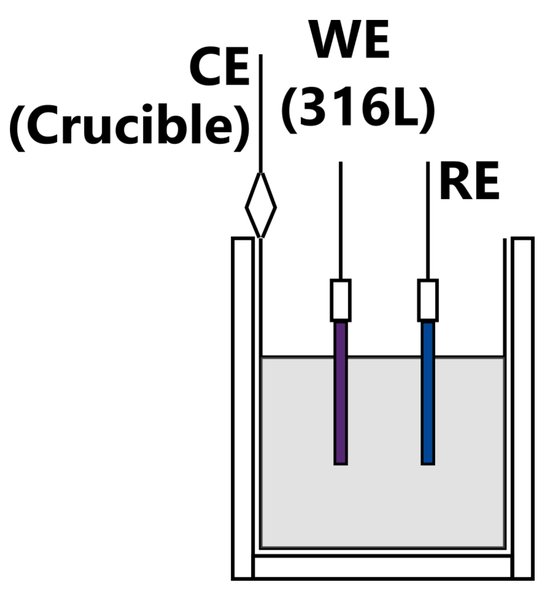
Link between surface microstructure and corrosion initiation location

Microscopy
Optical microscopy,
Scanning electron microscopy and X-ray microanalyses

Electrochemical and surface analyses

IN-SITU

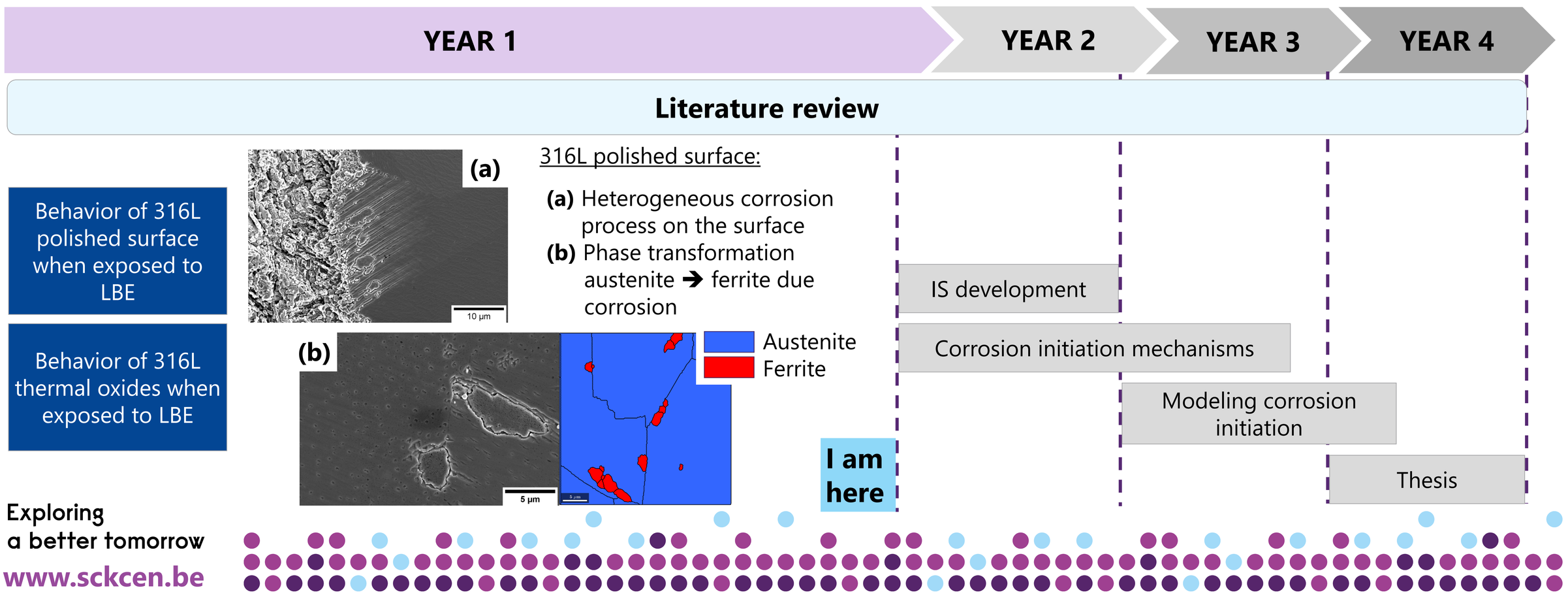
Measurement of impedance (IS) response of the system (316L/ oxide layer/ LBE)



Oxide layer response over time when exposed to liquid LBE

Propose to use multisine impedance spectroscopy (ORP-EIS) to improve the quality of the measurement

3. PROJECT PLAN



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