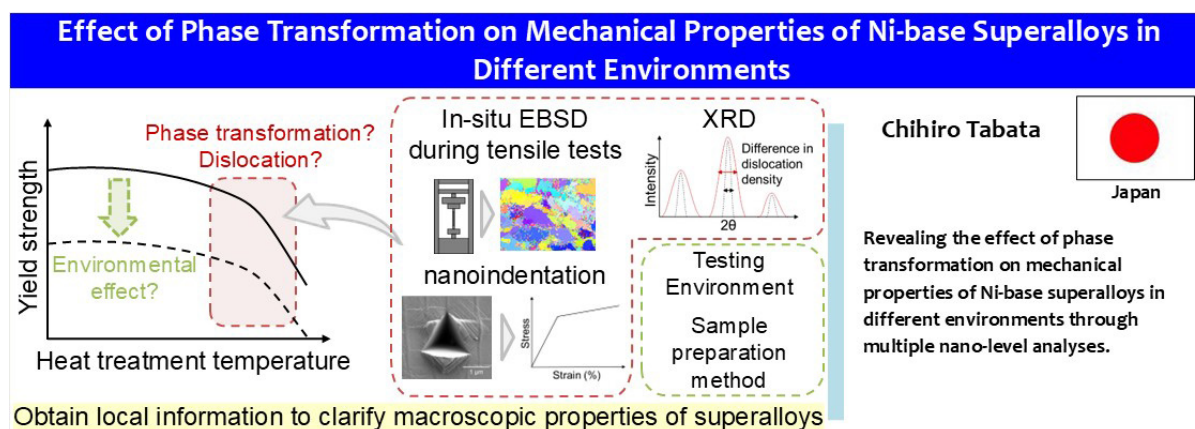


Effect of Phase Transformation on Mechanical Properties of Ni-base Superalloys in Different Environments

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■ Research

My main topic is on the phase transformation of Ni-base superalloys. Because of their excellent mechanical and environmental properties, Ni-base superalloys are used in various places such as jet engines, gas turbines, and nuclear reactors. However, some alloys show signs of phases transformation (metastable to stable) at high temperatures, impacting the mechanical properties. My goal is to clarify which factors affect the phase transformations, and how they impact the mechanical properties such as tensile or creep strengths. I focus on obtaining quantitative data on the morphology of the phases before and after the phase transformation for various conditions. I hope to use the local information such as dislocation density and nanomechanical properties to understand the macroscopic traits of superalloys. In the long term, I want to assess the effects of phase transformation in various environments, such as hydrogen or other types of corrosive conditions. By doing so, I would like to be able to predict and control the phase transformations, to best suit the conditions and environments that the superalloys are to be used in.

■ Comments

I came to NIMS as a 4th year undergraduate student. I started out as a trainee, and afterwards, I became part of their joint graduate program with Waseda University as a NIMS junior researcher. I applied to NIMS because I truly enjoyed the 6 years that I spent here and wanted to continue pursuing my passion for Ni-base superalloys in this environment. I was attracted to the ICYS program because it supports the development of early-career researchers as independent scientists, with full support and access to the facilities at NIMS. Coming to ICYS, I am very pleased with the technical and clerical support from my mentors and the center, as well as the international working environment. As a young researcher, I am looking forward to using this amazing opportunity to gain as much experience as possible to grow as an aspiring researcher.

■ Link

<https://www.nims.go.jp/icys/research/#TABATA>