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Advanced parent reconstruction : an efficient tool to optimize TMTs by a better control of the parent and subsequent inherited microtexture

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Optimizing the microstructure in a material which undergo a phase transformation during the thermomechanical treatment requires the control of both the parent and the child microstructure. In this framework, the reconstructions of the parent microtexture from EBSD maps measured on the transformation product have been proven to be very useful. Indeed, in many cases, such a method gives access to essential characteristics of the parent microstructure: Crystallographic texture, grain size, local orientation spread (with an angular resolution of 1.5-3°), deformation mechanisms, deformed/recrystallized fraction... [1]

In this presentation, the main principles of our reconstruction tool 'MERENGUE 2' and its benefits are recalled [2]. Several application examples are presented, especially in Titanium and in martensitic and bainitic steels. Finally the simultaneous knowledge of the parent and child microtextures allows a finer analysis of the transformation mechanisms. In this framework 'DECRYPT' software (Direct Evaluation of CRYstallographic Phase Transformation) has been developed. It is dedicated to analyzing the orientation data inherited by OR-based phase transformations. It is illustrated on different application examples to assess variant selection mechanisms at a local scale: variant clustering in Steels, selective grain boundary precipitation in Titanium...

[1] L. Germain, N. Gey, R. Mercier, P. Blaineau & M. Humbert, Acta Mater. (2012) 60, 4551–4562.

[2] Merengue2, Software, <http://lionelgermain.free.fr>