

MATERIALIA research group members have been awarded with the



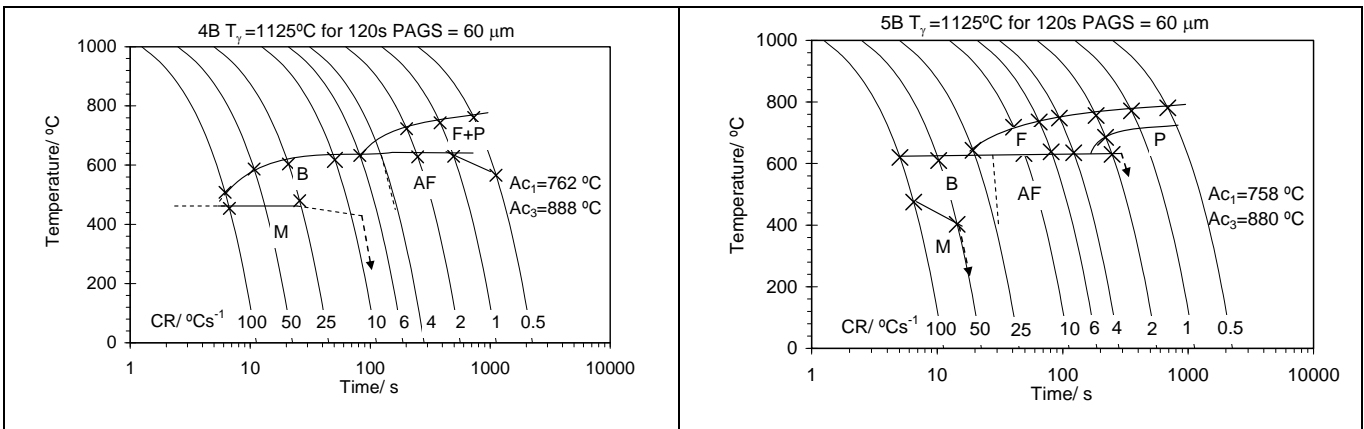
[Vanadium Award-Council](#) of the Institute of Materials, Minerals and Mining-UK for the most outstanding paper in the metallurgy and technology of vanadium and its alloys. Sponsored and selected by the Vanadium International Technical Committee (Vanitec).

Dr. Carlos Garcia-Mateo, Dr. Carlos Capdevila, Dr. Francisca G. Caballero, Mr. Juan Cornide and Prof. Carlos Garcia de Andres, members of the Physical Metallurgy Department of CENIM, were involved in the design of V-steels with acicular ferrite microstructure

Consequence of the research carried out the authors published a work in two parts at [ISIJ Int.](#)

Part I deals with the influence of N in its combination with V, as V(C,N) precipitates, on the decomposition of austenite into acicular ferrite. Likewise, the intragranular nucleation potency of V(C,N) precipitates is analyzed through the continuous cooling transformation diagrams (CCT) of two C-Mn-V steels with different contents of N under two different austenitising temperatures, *i.e.* different austenite grain sizes. The results clearly show that for austenite to decompose into acicular ferrite is necessary, first to have a representative fraction of V(C,N) precipitates within austenite, and second to decorate the austenite grain boundaries with proeutectoid ferrite so bainite can not form.

Ref. C. Garcia-Mateo, C. Capdevila, F. G. Caballero and C. Garcia de Andres. “Influence of V precipitates on acicular ferrite transformation. Part 1: the role of nitrogen” ISIJ International, Vol 48, No 9, (2008) 1270-1275.



4B and 5B are low C (0.08wt.%) -Mn steels high in V (0.25wt.%), 4B contains 0.0016wt.% N while 5B

0.0180wt.%. will become active for acicular ferrite nucleation. The low fraction of V(C,N) precipitates in 4B steel, as compared with 5B steel, explains the fact that acicular ferrite is observed in a smaller range of cooling rates or not at all. N is largely determining the density of V(C,N) precipitation

In Part II a combination of thermodynamic models as well as some physical metallurgical principles has been used to design of a heat treatment route that allow us to disclose the effect that V(C,N) precipitates have on the transformation kinetics of acicular ferrite by isothermal decomposition of austenite.

Ref. C. Garcia-Mateo, J. Cornide, C. Capdevila, F. G. Caballero and C. Garcia de Andrés. "Influence of V precipitates on acicular ferrite transformation. Part 2: transformation kinetics" ISIJ International Vol 48, No 9, (2008) 1276-1279..

