ADVANCED BAINITIC STEELS: TRANSFORMATION, MICROSTRUCTURE AND PROPERTIES.

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Wykł. nr	Data/Godzina sala	Tytuł	Opis
1	**23.02./14h15 WIM PW ul. Woloska 141 s.215**	**Bainitic transformation: going through some of the basics**	In this work a description of the phase transformation principles governing bainite transformation will be presented. The talk is intended to set the ground on the basics of the diffusionless transformation theory that will be used and further detailed in some of the latter lectures.
2	**24.02./14h.15 WIM PW ul. Woloska 141 s.215**	**Characterisation of Nanostructured Bainite I- Relevant Techniques**	For what and how we use some of the most common ,and not that common, characterisation techniques in order to extract basic information on bainite, from the macro to the atom level. Covering: - High resolution Dilatometry - XRD - TEM & HRTEM - 3D Atom probe tomography (APT)
3	**25.02./14h15 WIM PW ul. Woloska 141 s.215**	**Characterisation of Nanostructured Bainite. II-Complementary Use of Different Techniques (Case studies)**	The complementary use of some of the described techniques allowed a deeper understanding of some the insights of nanostructured bainite. Two case studies are presented: 1- Estimation of dislocation density during bainitic transformation of a nano structured steel by high resolution dilatometry and X-ray. 2- Understanding the C journey in Nanostructured bainite, an X-ray, APT & HRTEM study.
4	**26.02./10h15 WIM PW ul. Woloska 141 s.215**	**Contributing Factors to the Scale of Bainitic Ferrite. Measurement**	Giving the importance that the scale of the bainitic ferrite plate has on the mechanical response of these microstructures, it is important to understand the contributing factors that control its final thickness. Also, a practical case on the measurement of such magnitude, in a nano and sub-micron bainitic steel, will be presented.

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5	**2.03./12h15 WIP PW ul. Narbutta 85 s. 129NT**	**Bainitic Steels: Tempering.**	Bainite and martensite are both non equilibrium microstructures, they share common transformation mechanisms and some microstructural features as ferrite C enrichment and high dislocation density. Therefore it is not strange that all the tempering theory developed around martensite fits, quite well, also with bainite. In this talk we revise some general and important concepts regarding the tempering of bainite, and we end up the chapter with a very detailed study, up to the atomic scale, of the tempering of a new class of bainitic steels, nanostructures steels.
6	**3.03./12h15 WIP PW ul. Narbutta 85 s. 129NT**	**Microstructure-Properties Relationships in Bainitic Steels**	Bainitic microstructures have revealed a plethora of unique microstructural and morphological particularities direct consequence of the atomic mechanisms that rule bainitic transformation. Understanding the different and complex relationships between the mechanical properties and those microstructural features has turned out into a very difficult task with more than one possible solution, but on the other hand, absolutely necessary to understand the mechanisms governing these properties and for further development of these grades. This talk intends to present an overview of some of the most relevant advances done in this field.
7	**5.03./12h15 WIP PW ul. Narbutta 85 s. 129NT**	**Revealing tensile properties of nano bainitic steels. Case studies**	Practical examples of the ways and means as well as the results obtained during investigations regarding the microstructure – strength/ductility relationships in different nanostructured bainitic steels will be presented. Special emphasis will be put in the description of the ductility and TRIP effect in these novel microstructures
8	**6.03./12h15 WIP PW ul. Narbutta 85 s. 129NT**	**Tools for the Design of (Fast) Nanocrystalline Bainitic Steels**	Nanostructured mixed microstructures consisting of very thin plates of bainitic ferrite separated by carbon enriched austenite are the main characteristics of the novel NANOBAIN steel family. This study revises the essential principles in order to optimize such microstructure with the aim of ascertain how far all these concepts could be extended to design a new generation of inexpensive bulk nanostructured steels, in absence of the use of sever deformation, complex mechanical processing or rapid cooling. A revision of some of the alternatives to accelerate the otherwise sluggish transformation of this alloys will be presented.

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