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FEMS European Materials Gold Medal: Something more than powder

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In this lecture is made a brief route though the technology that has been the umbrella of all my academic life: powder metallurgy (PM). There are three main reasons to use this technology as an alternative to many others: 1) is a cost saving technology compared with alternative processes, 2) sometimes is a captive way to produce a part or a material and, 3) by the PM route is possible to obtain unique properties, better than any other alternatives. When I started my academic career, I did it working in my PhD thesis (1985), in PM low alloyed steels, materials that can be classified in the first group. In that time, the main questions to solve were why Cu swells during sintering and how was the role of carbon in this swelling. Many years after that, I am still working in answering those questions, but using much more efficient techniques to try to answer it. But I have also worked in materials of groups 2 and 3. As an example of the group 2 I go through one work where the aim is to replace Co as binder phase in harmetals, materials that only can be made by PM. And I also briefly report two examples of materials that can be considered from the group 3: new Co base superalloys for high temperature applications and high entropy alloys. In these later examples the main advantage of PM is the microstructural control and the ability of the technology to control the possible segregations and the grain size.
Aknowledgements.
I wish to acknowledge to all of those people who trusted on me, including those who has decided to award me with this Gold Medal, to all those academics who collaborate with me, and specially to my PhD students and all the students that walked with me part of the path.

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