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Controlling the performance of metallic materials through processing: the PROCOMAME research group

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The PROCOMAME (Metallic Materials Forming Processes) research group belongs to the Materials Science and Engineering department of the UPC. This research group devotes its activity to study the effect of the processing conditions on the evolution of the microstructure and consequently the properties of metallic materials. Through the years, the group has become experienced in high temperature deformation processes, such as forging or rolling, incremental forming, severe plastic deformation processes and, more recently, additive manufacturing using material extrusion technologies. Moreover, different metals and alloys have been evaluated, including different grades of advanced high strength steels, Ni based superalloys, as well as aluminum and magnesium alloys, to name a few. Some of the metallurgical phenomena which can take place during forming and define the final microstructure include recrystallization, recovery, precipitation, phase transformation, twinning, etc···The main objective of the research performed at the PROCOMAME group is the control of these phenomena through a proper design of the processing parameters, to optimize the performance of the material. Understanding the correlations between the evolution of the microstructure and the mechanical properties requires the use of advanced characterization techniques, including SEM, TEM, EBSD and XRD. The group is looking forward to increasing its characterization capabilities and knowledge by using synchrotron for specific research topics where this technique could provide valuable data through operando and ex-situ studies.

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