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High-Energy-Rate Processing of Materials Using Explosives J. RIBEIRO, R. MENDES, R. FARINHA, I. PLAKSIN, J. CAMPOS, J. GOIS, ADAI/LEDAP, Department of Mechanical Engineering, University of Coimbra — The overall field of application of explosives substances for material processing and synthesis include: Cladding/welding of dissimilar materials; the compaction/consolidation of nanocrystalline, super-hard, high-Tc superconducting composites, metastable highly-alloyed or amorphous powdered materials; the forming of small-series of very special shape and/or very special materials plates; the cutting of metal and/or concrete structures and the synthesis of nanocrystalline, ultradispersed, spherical shaped, single component or multicomponent (binary and/or ternary) metal oxide particles. The very special characteristic features of this technique makes it, sometimes, the only route available to achieve singular results and a promising widespread use can be envisaged for it in a near future. Pretending to contribute for that widespread use, this paper depicted the particular cases of the explosive welding and consolidation, presenting examples of the research activity developed recently at the Department of Mechanical Engineering of the University of Coimbra.

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