Advances in micro/nano scale materials processing by ultrafast lasers
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Materials processing by ultrafast lasers offers several attractive possibilities for micro/nano scale applications based on surface and in bulk laser induced modifications. The origin of these applications lies in the reduction of undesirable thermal effects, the non-equilibrium surface and volume structural modifications which may give rise to complex and unusual structures, the suppression of photochemical effects in molecular substrates, the possibility of optimization of energy dissipation by temporal pulse shaping and the exploitation of filamentation effects. Diverse applications will be discussed, including the development and functionalization of laser engineered surfaces, the laser transfer of biomolecules and the functionalization of 3D structures constructed by multiphoton stereolithography. Two examples will be presented in this context: A new approach for the development of superhydrophobic, self-cleaning surfaces [1,2] and the fabrication of functional scaffolds for tissue engineering applications [3-5].

References: