Development of a hybrid-machining-head for the manufacture of multifunctional surfaces of advanced ceramics by laser-assisted milling and integrated laser polishing - CeraSurf

Initiative: Herstellung funktionaler Oberflächen (beendet)

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Advanced high-tech ceramics possess outstanding material properties regarding hardness, form stability, abrasion resistance, corrosion resistance, low density, high temperature stability and deformation resistance. The further increase of ceramic applications is still hampered by the previous lack of flexible, ecological and economic machining technologies for the manufacture of ceramic components and especially for the defined functionalisation of ceramic surfaces. The objectives of the proposed project refer on the one hand to a significant increase of the economical and ecological efficiency and flexibility concerning the machining of advanced silicon nitride ceramics and on the other hand to the innovative functionalisation of ceramic surfaces by the accomplishment of high-resolved local defined discrete polished surface areas. The realisation of these objectives implies the development of a completely new hybrid machining technology that merges laser-assisted milling and simultaneous local laser polishing into one integrated hybrid machining process. Thus, inefficient sequential production steps will be substituted and complex ceramic surfaces will be realised whose topography consists of locally functionalised areas for the first time.

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