

Cofinanciado por:



UNIÃO EUROPEIA
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Título: Manufacturing of cutting tools for the 21st century: from nano-scale material design to numerical process simulation

Referência: SII&DT 45940 MCTool21

Código da Operação: POCI-01-0247-FEDER-045940

Acrónimo: MCTool21

Período de execução: De 01/04/2020 a 31/03/2023

Síntese do Projeto: Increasing requirements on high speed and dry cutting applications open up new demands on the quality of cutting tool materials. This is particularly important in the aerospace and automotive industries where easy and premature degradation of these tools is observed during the machining of hard-to-difficult materials. Several solutions have been tried to improve the machinability of these alloys, being the application of thin solid films by sputtering techniques the more promising. However, so far, such solution doesn't yet allow meet the need for high-speed machining and green manufacturing required for machining those materials. Recently, a successful UT Austin-Portugal exploratory project was running, involving the R&D promoters of this proposal, to develop a newly efficient green coating system with capacity to control the release of a lubricious phase able to improve the cutting performance of hard-to-machine materials. The coatings, based on the TiSiAgN system, were deposited with a nanocomposite structure (TiN grains embedded in a Si-N phase) with Ag in the form of nanoclusters evenly distributed in the bulk. Thus, the adhesion of the counterpart material to the coating is avoided with a significant decrease on the friction coefficient, preventing the growth of building edges which often leads to the cutting tool failure. Pressed by the strong foreign competition, particularly by the leading companies, and desiring to reinforce the position of industrial promoter in the special cutting tool market, the consortium of this project aims: i) to upscaling the developed coatings to industrial level and ii) to develop simulation tools which allows to optimize the size, geometry as well as to predict the right machining parameters to improve the performance of the cutting tool directed to hard-to-machine materials. The success of the industrial application of this coating system allows predicting productivity gains and increase of the competitiveness of the company.

Instituições participantes no Projeto: INOVATOOLS PORTUGAL, UNIPESSOAL LDA, UNIVERSIDADE DE COIMBRA, UNIVERSIDADE DO MINHO

Instituição Financiadora: Agência Nacional de Inovação, S.A.

Programa de Financiamento: PT2020 - I&D Empresas - Co promoção Parcerias Internacionais

Objetivo temático: Reforçar a investigação, o desenvolvimento tecnológico e a inovação

Apoio financeiro da UE: 647.849,94 €

Custo total elegível (EUR): 886.000,25 €

Apoio financeiro público nacional: 151.593,80 €