Patent Search

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Inventor

Name	Address	Country
Dr. Harpreet Singh Arora	Associate Professor, Department of Mechanical Engineering, School of Engineering, Shiv Nadar University, NH91, Tehsil Dadri, Gautam Buddha Nagar, Uttar Pradesh, UP- 201314, India	India
Arpit Thomas	Department of Mechanical Engineering, School of Engineering, Shiv Nadar University, NH91, Tehsil Dadri, Gautam Buddha Nagar, Uttar Pradesh, UP- 201314, India	India
Ambrish Kumar	Department of Mechanical Engineering, Shiv Nadar University, NH91, Tehsil, Dadri, Gautam Buddha Nagar, Uttar Pradesh, UP-201314, India	India

Applicant

Name	Address	Country
Shiv Nadar (Institution of Eminence Deemed to be University)	NH91, Tehsil Dadri, Gautam Buddha Nagar, Uttar Pradesh 201314, India.	India

Abstract:

The present invention relates to an efficient, facile and scalable technique for nano-moulding of metals and alloys through severe surface deformation. Particularly th relates to process of preparation of nano-textures in crystalline metals and alloys. The process comprises placing the metal alloy as work piece on a nanomould made anonized alumina. The mould having pores of selected dimensions, rotating the tool of the milling machine to come in contact with work piece and continuous rotati friction heating due to the rotating tool on the surface and high strain-rate deformation of the work piece causes it to flow into the pores of the nanomould kept belo yielding nanostructured work piece.

Complete Specification

FIELD OF INVENTION

The present invention relates to a nano-texturing process. More particularly, the present invention relates to an efficient, facile and scalable technique for nano-mo of metals and alloys through severe surface deformation. Particularly the present invention relates to process of preparation of nano-textures in crystalline metals a alloys.

BACKGROUND OF THE INVENTION

The existing, conventional nano-moulding processes for nano-texturing of metals involve heating the metal to high temperatures. The application of such high temperatures needs specialized equipment and heating arrangements which significantly increase the process complexity and overall cost. In addition, the operatir temperatures, during conventional nano-moulding of high strength materials with poor flow-ability, further tend to increase. Another issue of conventional nano-m is the severe surface oxidation owing to the high operating temperatures.

US9034233, Method of processing a substrate (INFINEON TECHNOLOGIES AG) is related to processing a substrate by imprinting the material using a stamp device. T material is deposited into the trenches after embossing it using a stamp device. However, the current invention utilizes in situ heating through factional heating alo high strain rate deformation. The viscosity of metal/alloy reduces significantly at high strain rates, resulting in rapid mold-filling without going to high temperatures.

US20140254338 is on improving the resolution, pattern fidelity, and symmetry of microelectronic structures for thin-film head manufacturing. The entire bars of thi heads are manufactured using nanoimprint lithography, which reduces alignment errors between neighbouring thin-film heads in a bar of thin-film heads.

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