Laser surface texturing with thermal post processing for the modification of wettability properties of titanium alloy

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The creation of micro and nanostructures on metal surfaces has been widely explored for different purposes. The possibility of changing the wettability properties of a material is a key challenge. The use of femto and picosecond pulse duration lasers has proven to be increasingly reliable for the creation of super-hydrophobic surfaces in different types of materials to date. However, the use of robust fibre-based nanosecond pulsed laser for the creation of super-hydrophobic materials can reduce the equipment cost and complexity for the creation of these surfaces. In this research, the creation of super-hydrophobic surfaces on polished Ti6Al4V with a fibre-based nanosecond pulsed laser is explored. The production of customised topography with a low-temperature annealing post-treatment is explored in order to create a robust super-hydrophobic behaviour in the surface of the material. The surface topography is analysed with scanning electron microscopy (SEM), white light optical profiling and X-ray photoelectron spectroscopy (XPS). Contact angle measurements were used to characterise the effects of the chemical surface and the structure created on the wetting properties of the material.