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Special Issue Reprint

High Performance and Hybrid Manufacturing Processes

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The manufacture of parts for transportation vehicles, precision components, and bioengineered implants is reliant on high-performance manufacturing processes. On the one hand, these provide shorter set-up and lead times, higher production rates, and greater accuracy and precision. On the other hand, they necessitated the use of new technologies, optimised processes, and enhanced materials. The precision of high-performance manufacturing has also advanced from being in terms of tenths of millimetres to below hundredths in a century, and currently, some machines are on the verge of crossing the nanometre barrier. Most recently, hybrid manufacturing technologies have gained popularity, as they offer great potential in obtaining high-quality products with greater productivity, accuracy, energy efficiency, and with minor impacts on the environment. Despite this, most hybrid manufacturing methods are still in the research stage, with just a handful making it into industrial use. The current and future needs for machine tools and manufacturing operations include the use of less power and increased eco-friendliness, while maintaining the integrity of products. This Reprint sheds light on 'High Performance and Hybrid Manufacturing Processes' and provides a platform for the discussion of the recent successes, key topics, and challenges for future study in the field.

