Multi-metal additive manufacturing process chain for optical quality mold generation

This paper introduces an innovative process chain for the generation of mold elements based on multi-metal additive manufacturing. Starting from an indirect tooling approach for the fabrication of a mold master with optical surface quality, three different additive processes, namely electroforming, thermal spraying and selective laser melting (SLM), are combined to manufacture a test mold element. In order to maintain the targeted optical quality of the mold surface, SLM process parameters optimization has been carried out through numerical simulations. The approach is experimentally verified by generating prototype mold inserts and validated in injection molding trials, showing no signs of degradation of the mold insert after 1000 injection molding cycles.

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