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## In-process absorption and reflectivity measurements of coated powder in laser powder bed fusion

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### Abstract

Materials such as copper are not well suited to laser based additive manufacturing due to their high reflectivity at commonly used laser wavelengths. One strategy to mitigate this problem is to coat the powder particles with a thin layer that improves energy absorption. Whilst it is relatively simple to characterise the improved absorption on the bench, it is more challenging to measure in-process where the laser will cause the coating to breakdown. In this research, the absorbed and reflected energy during processing are measured using a combined calorimetry and integrating sphere set up. Additionally, melt pool temperature is recorded using a high-speed two-colour imaging system. Relationships between coating type, reflectivity, absorption and melt pool temperature are presented and discussed.

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