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Towards high speed laser cutting of thin transparent polymer films

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It has been shown that high speed laser sealing of polymer films to opaque polymer substrates is most effective when the laser wavelength is chosen so that the former is ostensibly transparent, resulting in a rise in temperature at the film/substrate interface. This raises a technical conundrum: the ideal sealing laser is therefore unsuitable for subsequent cutting of the film, a necessity for any non-contact production system. This work identifies and characterises a novel methodology to achieve cutting of highly transparent films at speeds of 250 mm.s-1 using a traversing incident fibre laser to incubate a moving superheated vapour. Through thermal finite element simulation and experimentation it is shown that application of a short initial dwell time followed by linear ramping of traverse velocity develops, accelerates and supports a flame front. Exothermic reaction of the highly absorbing polymer vapour incubated during the initial dwell acts as a secondary heat source, providing the energy required to facilitate cutting of the film.

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Economy of style: Identifying low-cost, high-impact packaging design strategies

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In an ever-changing economy, and as consumers' values and purchasing behaviors evolve, we see a growing shift towards responsive, timely packaging design solutions, often with shorter life cycles than ever. For brands, it has been a challenge to find ways to best compete in this landscape without incurring exhorbitant costs in packaging turnover. Historically, the two design paths available have either addressed aesthetic and brand needs at the expense of cost and manufacturing, or have addressed cost and manufacturing needs with a penalty to brand and aesthetics. The solution is to find partnerships that can help marry technical, business and marketing aspects of packaging design, for effective, efficient and compelling design solutions in a changing market.

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