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PROCEEDINGS

Challenges and Advances in Spot Joining Processes of Automotive Bodies

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ABSTRACT

The implementation of lightweight materials and structures in automotive body manufacturing is a strategic approach to improve fuel efficiency of energy-efficient vehicles and driving range of new energy vehicles. However, high specific strength low-ductility light metals (like 7xxx aluminum, magnesium and cast aluminum), ultra-high strength steels, high-stiffness profile structures and their mixed use poses a big challenge to existing commercial spot joining processes, such as resistance spot welding and self-piercing riveting. In this talk, the challenges which new lightweight materials and structures pose to spot joining process will be presented, the bottleneck of the existing processes will be analyzed, and finally some newly developed innovative spot joining processes, such as magnetic assisted resistance spot welding (MA-RSW), friction self-piercing riveting (F-SPR), and friction stir riveting (FSR), will be introduced. The outstanding joining performance will be presented through comparing with commercially used processes, such as RSW, SPR, FDS etc.

KEYWORDS

Low-ductility light metals; riveting; resistance spot welding; hybrid joining mechanism; magnetic assisted welding

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