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From Scrap to Safety: Low-CO_2 Steels in Automotive Applications

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Steel production accounts for approximately 7–9% of global CO_2 emissions, making it one of the most critical industrial sectors in the transition toward climate neutrality, a strategic objective of the European Union by 2050. To reduce environmental impact, many steelmakers are converting traditional Blast Furnace–Basic Oxygen Furnace (BF–BOF) routes to more sustainable technologies such as the Electric Arc Furnace (EAF), which is primarily based on scrap recycling and supplemented with DRI (Direct Reduced Iron), HBI (Hot Briquetted Iron) and pig iron.
However, increasing the scrap content results in higher concentrations of tramp elements, particularly copper (Cu) and tin (Sn), which can negatively affect steel performance by altering microstructure and reducing formability, weldability and fracture resistance. This challenge is especially relevant for automotive applications, where safety, reliability and lightweighting requirements are extremely demanding.
In this context, the European RFCS project "Safe&Clean", coordinated by EURECAT and involving ten industrial and academic partners, aims to characterize low-CO_2 steel sheets produced through innovative processing routes and compare them with equivalent grades manufactured via conventional BF–BOF production. The experimental work focuses on two advanced high-strength steels for automotive structures: DP780 (provided by Salzgitter) and H550MS (provided by SSAB). These materials will be examined through comprehensive chemical, microstructural and mechanical characterization, as well as functional testing including crashworthiness, fatigue resistance and structural integrity under quasi-static and dynamic loading.
To evaluate real-application behaviour, two demonstrator components will be manufactured by the end-users: a side connector produced in DP780 (CRF) and a lower control arm produced in H550MS (Autotech).
The expected outcomes will support the development of technical guidelines for the industrial adoption of low-CO_2 steels in automotive applications, contributing to the decarbonization of European mobility and promoting a more sustainable and circular steel value chain.
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