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how thermoplastics differ from traditional composites unlike traditional thermoset composites which require lengthy production times and large costly autoclave ovens thermoplastics are produced out of autoclave and can be stamp formed in their required shape in just a few minutes benefits of thermoplastic composites up to a 50 weight reduction in structural components compared to metallic solutions parts manufactured in minutes instead of hours 80 reduction in manufacturing cycle time higher impact resistance compared to thermosets assembly by welding minimizes and can even eliminate the need for fasteners thermoplastics play a pivotal role in composite materials by serving as the matrix phase that binds reinforcements together unlike thermoset resins thermoplastics possess the ability to soften and reform when heated allowing for reshaping and recycling thermoplastic composites for aerospace applications use high performance thermoplastic resins including polyetheretherketone peek polyetherketoneketone polyaryletherketone polyetherimide and polyphenylene sulfide aerospace thermoplastic composites typically have percentages of carbon fiber around 50 60 by volume thermoplastic composites tmcs evolved from structural polymer composites these materials do not experience chemical instability because they utilize a thermoplastic matrix when heated tmcs soften and can be remolded without degradation when they cool they solidify into the finished shape updated 2 22 2023 published 5 29 2019 thermoplastic composites poised to step forward the evolving role of thermoplastic materials and processes and their future in next generation commercial aircraft sustainability out of autoclave workforce development materials adhesives atl afp infrastructure processes resins thermoplastics

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