

Targeted use of residual stress in electrical steel to increase energy efficiency

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Stacked electrical steel sheets compose the magnetic core of electric engines, in which the magnetic flux is guided by cut-outs in the sheets. We developed magnetic flux guidance by targeted residual stress instead of cut-outs to increase the maximum achievable rotational speed of electric engines by increasing the mechanical stability. Due to a combination of limitations, we primarily probed the electrical steel sheets using neutron grating interferometry. To further understand the connection between residual stress and magnetic properties of electrical steel, we would like to discuss additional measurement and simulation techniques, such as strain-mapping, X-ray diffraction or micro-magnetic simulations.

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