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# Enhanced magnetoimpedance effect of $\text{Fe}_{75.5}\text{Cu}_1\text{Nb}_3\text{Si}_{13.5}\text{B}_7$ ribbon covered by in-situ growth vertical graphene sheets

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## Abstract

Vertical graphene-sheets have been successfully in-situ deposited onto  $\text{Fe}_{75.5}\text{Cu}_1\text{Nb}_3\text{Si}_{13.5}\text{B}_7$  ribbon by plasma enhanced chemical vapor deposition and the enhanced magnetoimpedance effect has been observed in the composites. A mass of curly graphene-sheet clusters can be apperceived if there is no buffer layer during the growth. The 20 nm FeCo film is used as the buffer layer during the deposition, and then vertical growth graphene sheets are covered on the Fe-based ribbon as a film. Compared with the untreated sample, the field-dependent magnetoimpedance effect has been obviously improved with graphene covered at low frequencies. At a certain frequency, the magnetoimpedance effect of one side graphene covered sample shows enlargement, but the both sides covered sample shows the reversed tendency. We mainly attribute the reason to the enhanced transverse permeability induced by the vertical graphene morphology.

Keywords: graphene; magnetoimpedance effect; amorphous materials; magnetic materials

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