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## Effect of Different Impregnation Materials on Electromechanical Behaviors of Superconducting Compact Cables

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Improvement of mechanical stability of superconducting cables under high mechanical loads is one of the most important challenges for their industrial application. Provided that impregnation is commonly adopted to protect coil wound by superconducting tapes from mechanical disturbance caused by Lorentz force generated from magnetic field and rotational vibration of machines such as motor, this paper focuses on the selection of impregnation materials towards conductor on round core (CORC) cables. Electromechanical behaviors of CORC cable samples impregnated by different materials, including solder, paraffin wax and epoxy resins such as Stycast, are investigated using experiment and related fractographic observations. Testing results shows a wide range of variation in degradation of measured critical current, which may be attributed to delamination and cracks observed on HTS tapes of cable samples. Therefore, proper impregnation materials should be chosen to maintain electrical performance while enhancing mechanical strength of CORC cable. We expect conclusions obtained from this paper can provide guidelines for future fabrication of coil wound by impregnated CORC cables.

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