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## **Wed-Af-Po3.18-02 [39]: Effect of Core Materials on the Electrical Properties of Superconducting Conductor on Round Core Cable**

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High temperature superconducting (HTS) conductor on round core (CORC) cable is considered as a potential technology for power applications, because of its high current-carrying capacity, compactness, and strong mechanical properties. As the main component of CORC cable, the center core is used to support the HTS conductors. However, for metal center core, the eddy current induced in the core under alternating electromagnetic field is unneglectable, which will lead to extra AC loss in power applications. This paper focuses on the selection of center core of CORC cable. AC loss of CORC cable using different center core is evaluated by both numerical and experimental methods, in which copper, aluminum, nickel, stainless steel and fiberglass epoxy (G10) have been chosen as the core. Results illustrate that AC loss of CORC cable has a correspondingly decrease with the resistivity of the core material, and this effect also relies on the shielding effect of the outer HTS conductors. Besides, CORC cable with core of nickel shows a quite different AC performance due to its ferromagnetic characteristics. Conclusions obtained from this paper will provide essential data for the future optimization on the design of CORC cable.

Key words: High temperature superconductor, Conductor on round core, Magnetization loss, Transportation loss, Shielding effect

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