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Tue-Af-Po2.24-12 [111]: High Coupling Characteristics of Resonance Coil for Superconducting Wireless Power Transfer

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In this study, a wireless power transfer (WPT) technology with a superconductor was proposed. The proposed technology maximizes efficiency by applying superconducting characteristics to the resonance coil. To maximize the efficiency of the resonance coil during WPT, it is essential to consider the inductance and coupling coefficient (k). They are determined by the shape of the resonance coil.

As such, a rounded rectangular resonance coil was proposed and its characteristics were analyzed using the HFSS software. The shape of the proposed coil considered the electric current concentration due to curvature. The simulation analysis results showed that the cross-sectional area of the rounded rectangular resonance coil was approximately 21% larger than that of the circular resonance coil. In addition, the inductance and coupling coefficient (k) increased. Therefore, it was confirmed that the efficiency of the proposed coil was approximately 14% higher than that of the circular resonance coil.

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