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# Effects of multi experimental cycles on pressure/gap-impedance characteristic of coil made of carbon black filled silicone rubber composite

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## Highlights

- The variations in the impedance of the coil made of conductive polymer composite at the non-contact and contact stages are studied.
- The changes in the impedance of the composite coil under the multi experimental cycle are investigated.
- A method to improve the repeatability of the pressure/gap-impedance characteristic of the composite coil is proposed.

## Abstract

The pressure-impedance characteristic at the contact stage and the gap-impedance characteristic at the non-contact stage for the coil made of carbon black filled silicone rubber composite (i.e. composite coil) under the multi experimental cycles are studied. In each experimental cycle, there is a critical impedance for the composite coil. If the composite coil is at the contact/non-contact stage, the impedance is less/more than the critical impedance. The impedance changes monotonically with the variation in the pressure/gap at the contact/non-contact stage. Therefore, the impedance of the composite coil has the potential to be used to measure the pressure/gap at the contact/non-contact stage. However, there are deviations among the pressure/gap-impedance curves under the multi experimental cycles, which results in that the repeatability

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