A Study on influence of iron to the resistivity characteristics of several kinds of white micas

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Abstract: In order to deeply understand the differences of insulating properties of various white micas, and the effects on the insulating property by various contents of iron impurity in white micas, a small self-developed electrode experimental instrument for measuring electrical resistivities of minerals and solid insulating materials and relevant analytical method have been applied in this paper to measure volume resistivity and surface resistivity of samples. eBased on the analysis of crystal structure and crystal chemistry of samples, the mechanism of the insulating property influenced by various contents of iron impurity in white micas has been further elucidated. The results show that the volume resistivity and surface resistivity of muscovite, sericite, fragmental mica, microcrystalline muscovite samples are very high, with the average value of $8.48\times10^{12}\Omega\cdot$cm and $2.20\times10^{11}\Omega$, respectively, indicating all white micas have excellent insulating properties. Although there are relatively big differences among their chemical compositions, especially the contents of iron impurities, there are only slight differences among their volume resistivities and surface resistivities, respectively. This is because all white micas have same mineral phase characteristics, that means they all belong to $2M_1$ type muscovite, and no adverse effect on the insulating property of the white micas has been caused by iron contents as the iron occurred in forms of isomorphism in the crystal lattices of those white micas.

Keywords: muscovite; sericite; fragmental mica; microcrystalline muscovite; insulating property