Mechanism of transient electric activities associated with rock failure

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In this study, simultaneous measurements of fracture-induced electromagnetic signals have been made in a series of uni-axial fracturing experiment. Electric signals were recorded as transient electric charges and as a potential difference between two electrodes of copper plates. Electric signals that appeared prior to main failure were recorded only for granitic rocks. At the timing of main failure, however, intense electric signals were recorded for all specimens but limestone.

Our results suggest that a certain amount of electric signals do appear at the fracturing of brittle materials, irrespective to the existence of piezo-electric materials. We should bear the observed two types of electric phenomena in mind for further study.

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