Mechanism of transient electric activities associated with triaxial rock failure

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Many experimental studies had been conducted recently to elucidate electro-magnetic phenomena associated with an earthquake. While ideas of polarization due to piezoelectric effect of quartz crystal and electrokinetic phenomenon in the fluid within a fracture area as one of possible candidate for the phenomena are supported, our uniaxial fractural tests on un-piezoelectrical materials (rocks not include quartz such as gabbro and dunite), MgO and other materials revealed a charge fluctuating on the test material surface during the fractural process of the specimens; suggesting that the transient electro-magnetic fields are generated by fractures other than the polarization of piezoelectric material. To investigate source process associated with the electro-magnetic phenomena due to fractures of brittle materials in a focus area, rock compression-fracture tests under confining pressures as high as 100 MPa are conducted to measure electrical and magnetic fields.