



## **Experimental Study of Forecasting Rock Burst in Coal Mine with Infrared Radiation**

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Infrared thermography is used as a non-destructive, non-contact infrared sensing technique to forecast the rock burst in coal mine. In accordance with the practical condition of fully mechanized sublevel caving face in Shuiyu Coal Mine in China, the deformation and fracture of sandstone and coal were experimentally studied by means of thermal infrared (TIR) imaging system in the process of confined compressions. It is found that the samples surface TIR temperature (TIRT) changes with the increase of load. Furthermore, TIRT change non-synchronously in different ranges such as the location of stress concentration, crack extended area and broken ranges. The TIRT is higher in the location of stress concentration and crack extended area than that in the location of stress relaxation and broken ranges. The infrared omen of sample fracture is determined according to the quantitative relationship of TIRT, radiation flux density changes and strain fields of the sample. When load is 80% of the peak load, The TIRT begin to increase rapidly and infrared anomaly occur at the location of stress concentration and crack extended ranges. The rock burst will happen if the sample TIRT increases, then decreases, then increases and at last decrease rapidly. The results are basically meaningful for the forecast of some natural and rock-engineering disasters, such as earthquake, mine burst and landslide.