

Accepted Manuscript

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PII: S1359-4311(17)36272-5

DOI: <https://doi.org/10.1016/j.applthermaleng.2018.05.074>

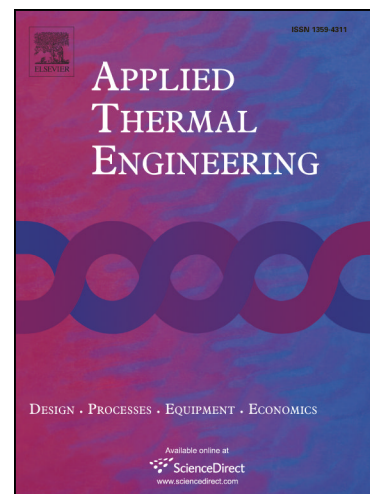
Reference: ATE 12213

To appear in: *Applied Thermal Engineering*

Received Date: 28 September 2017

Revised Date: 25 April 2018

Accepted Date: 18 May 2018



Please cite this article as: L.F. Fan, J.W. Gao, Z.J. Wu, S.Q. Yang, G.W. Ma, An investigation of thermal effects on micro-properties of granite by X-ray CT technique, *Applied Thermal Engineering* (2018), doi: <https://doi.org/10.1016/j.applthermaleng.2018.05.074>

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An investigation of thermal effects on micro-properties of granite by X-ray CT technique

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ABSTRACT

The thermal effects on micro-properties of granite were experimentally studied. The volumetric porosity was observed by the X-ray Computed Tomography (CT) technique and three-dimensional (3D) image reconstruction. Two indexes (heterogeneity coefficient and anisotropy coefficient) were proposed to describe the micro-properties of granite. The thermal effects on these two indexes were discussed. The results shows that micro-porosity increases as temperature increases between 400 °C to 800 °C. It is slightly influenced by temperature beyond this range. Both of the heterogeneity and anisotropy of thermal treated granite increase to their maximums as temperature increases to 500 °C, than decrease to constants as temperature further increases. The heterogeneity and anisotropy of granite are mainly dominated by the initial cracks below 200 °C. The thermal induced cracks are mainly in the regions of lower density mineral grains below 400 °C. Boundary cracks and trans-granular cracks generate significantly above 500 °C.

Keywords: Thermal effect; X-ray Computed Tomography (CT) technique; Porosity; Heterogeneity; Anisotropy.

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