

Flexible ceramic imitating Itacolumite (Kon-nyaku stone)

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Introduction

Itacolumite(Kon-nyaku stone), flexible sandstones, is a kind of metamorphic quartzite. It has three-dimensional interlock cracks among the grain boundaries of quartz similar to the jigsaw puzzle, and therefore it is able to freely within a limited arc. In order to make micro cracks similar to itacolumite, two kinds of ceramics with different thermal expansion were mixed, formed and sintered. This report is an analysis of about composite samples which showed stress-strain diagram similar to itacolumite.

Experimental procedures

Composite samples were prepared form leucite(KAlSi_2O_6 : high thermal expansion material) powder and KZP($\text{KZr}_2(\text{PO}_3)_4$: low thermal expansion material) granule. They were tested by three-point tests, porosity measurement, XRD, SEM and CT-scan, and compared with some itacolumites.

Results and Discussion

Figure.1 shows the stress-strain curves of (a) itacolumite and (b) composite sample. The composite sample was bended as having resembled itacolumite. CT-image of itacolumite and composite sample is shown Itacolumite consisted of quartz grains, which had irregular and many micro cracks, while composite had little micro cracks. The grain size of itacolumite was about $35\mu\text{m}$, grain size of composite was more than $100\mu\text{m}$ and less than $1000\mu\text{m}$.

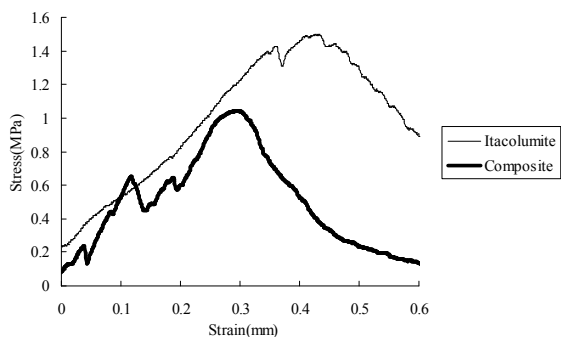


Fig.1 stress-strain curves of itacolumite and composite

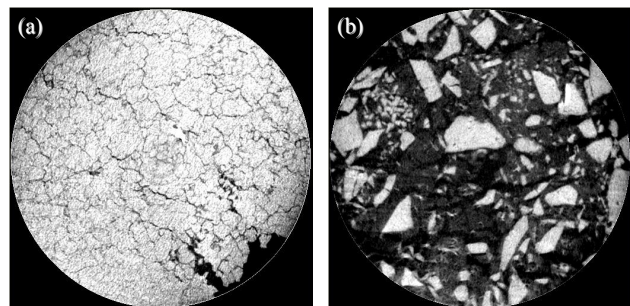


Fig.2 CT images of (a);itacolumite, and (b);composite

About Myself

Name : Kosuke Tamaki
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Nationality : Japanese
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