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# The Effect of Curing Temperature on Initial Bonding between Wellbore Cement and Formation Rock

Cement is used in a wellbore to isolate the formation fluids from the adjacent geologic regions. However, the interfaces between cement and casing as well as cement and formation can develop into leakage conduits in the form of microannuli. The formation of microannuli is a result of poor bonding which can be related to differential stress exerted on wellbore system due to the changes in temperature and pressure. Microannuli is a type of cement sheath failure which can lead to significant leakage depending on the type of fluid and geometry of the microannuli. Studies over the years have assumed and simplified the pore geometry to be homogenous and uniform. In contrast, the recent studies have revealed the complex nature of the geometry of the microannuli. In this experimental work, effort was made to visualize the initial cement bonding between formation and cement sheath in three-dimensional space. X-Ray CT scanning was carried out on cylindrical composite samples prepared with sandstone and API class G ordinary Portland wellbore cement. The images were reconstructed and analysed using AVIZO. The effect of different curing temperature is illustrated through quantification of microannuli and by analyzing their geometry.

## Level of Expertise

Student

## Presenter Gender

Man

## Pronouns

He/Him

## Do you intend to attend UM2022

In person - Melbourne

## Students Only - if available would you be interested in student travel funding

No

## Students Only – Do you wish to take part in the Student Poster Slam

Yes

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Yes

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