

# OXIDANT STIMULATION OF COAL SEAM PERMEABILITY

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## INTRODUCTION

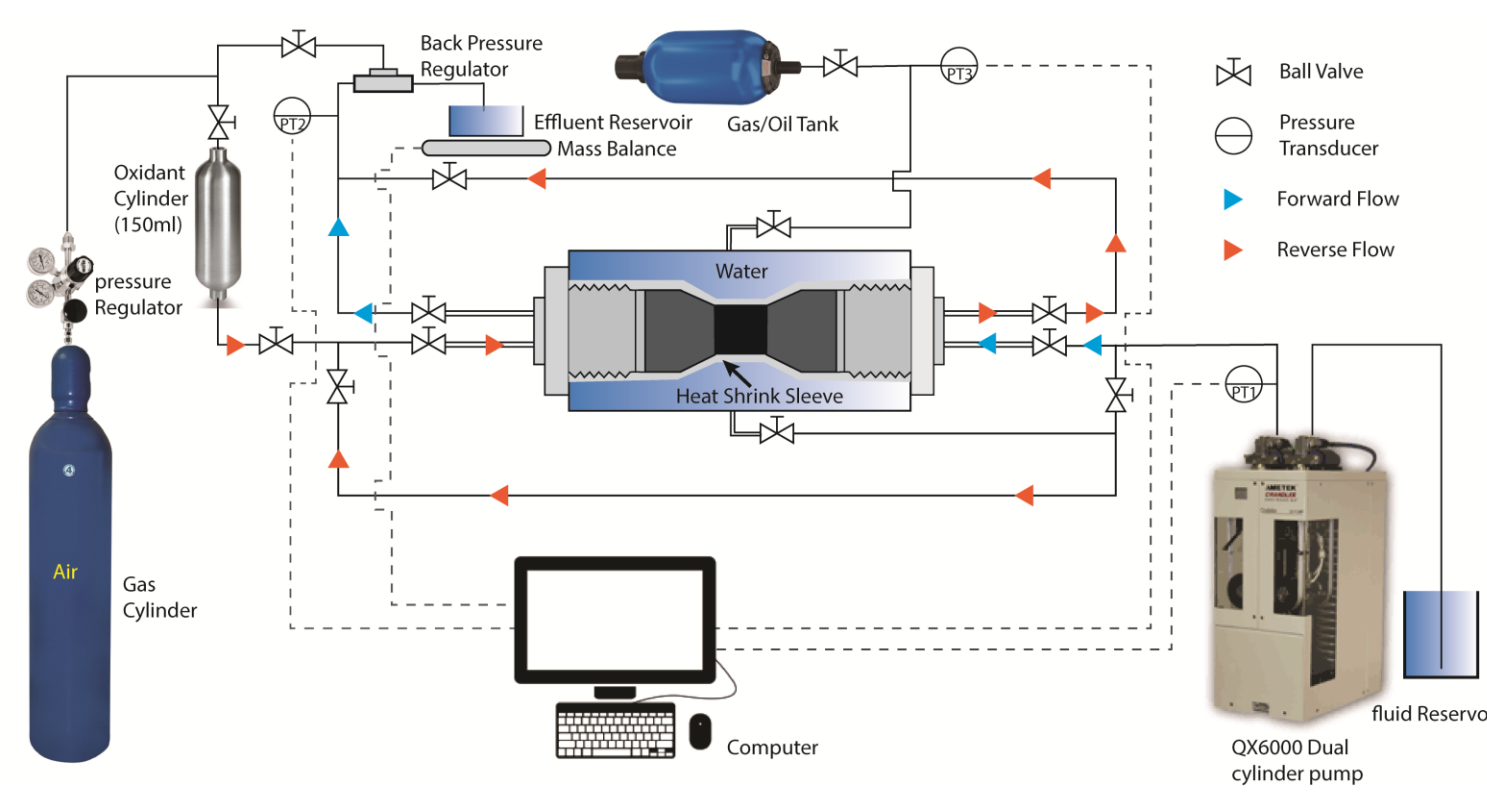
Low permeability renders a significant fraction of coal seam gas (CSG) resources sub-economic. An effective permeability enhancement strategy is thereby crucial in monetising a large proportion of low permeability CSG resources. This study introduces the concept of using oxidants for permeability enhancement, describes different oxidation effect on different coal samples and shows CT-Scanning images to examine the coal structure change after coal core flooding test using NaClO.

## AIMS

- Study the coal behaviors of two different coals in NaClO;
- Study both coal structure change after NaClO oxidation;
- Investigate acid stimulation and oxidant stimulation effects on the structure of coal samples.

## METHODOLOGY

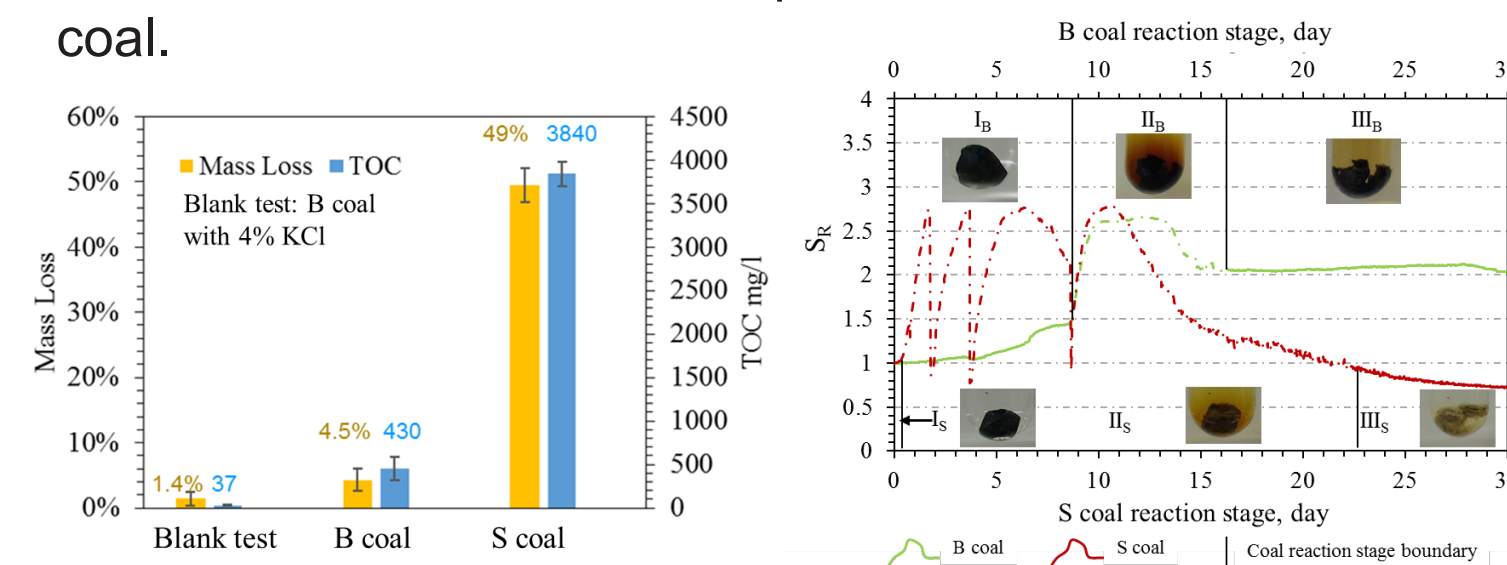
- ❖ Swelling Test & Leaching Test
- ❖ Porosity Test & SEM
- ❖ Cleat Flow Cell
- ❖ Coal Core Flooding Test & CT-Scanning



## RESULTS & DISCUSSION

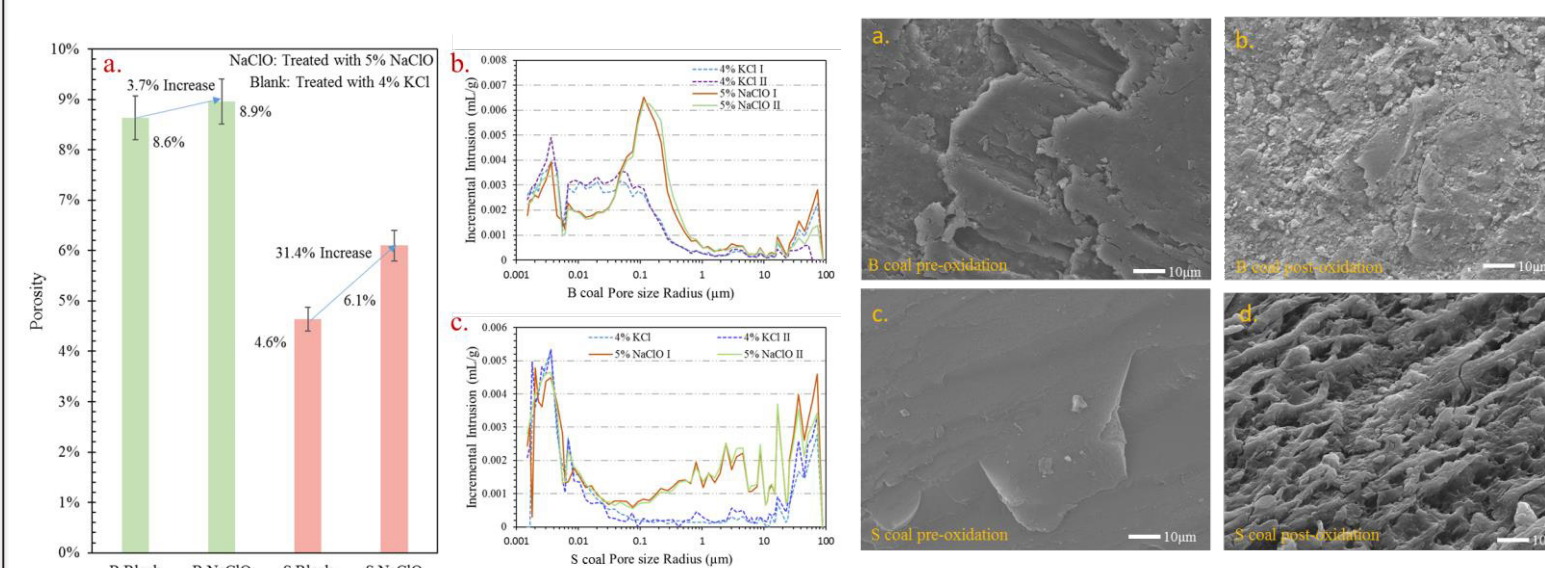
### ➤ Leaching test & swelling test

Results illustrate that NaClO prefers to react with Surat basin coal.



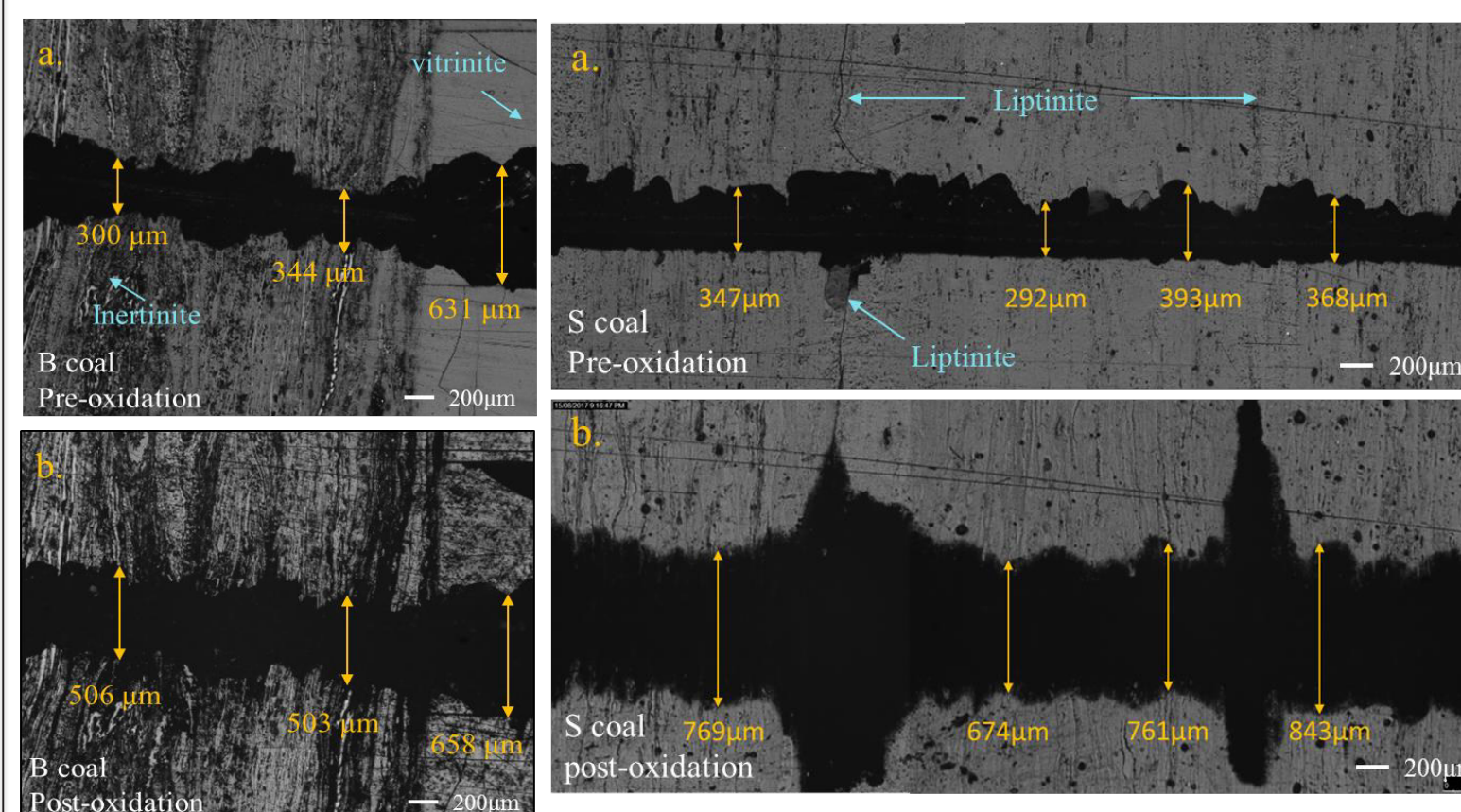
### ➤ Porosity test and SEM

Results show the coal porosity and pore size enlargement after oxidation, which might facilitate the gas diffusion in coal matrix.



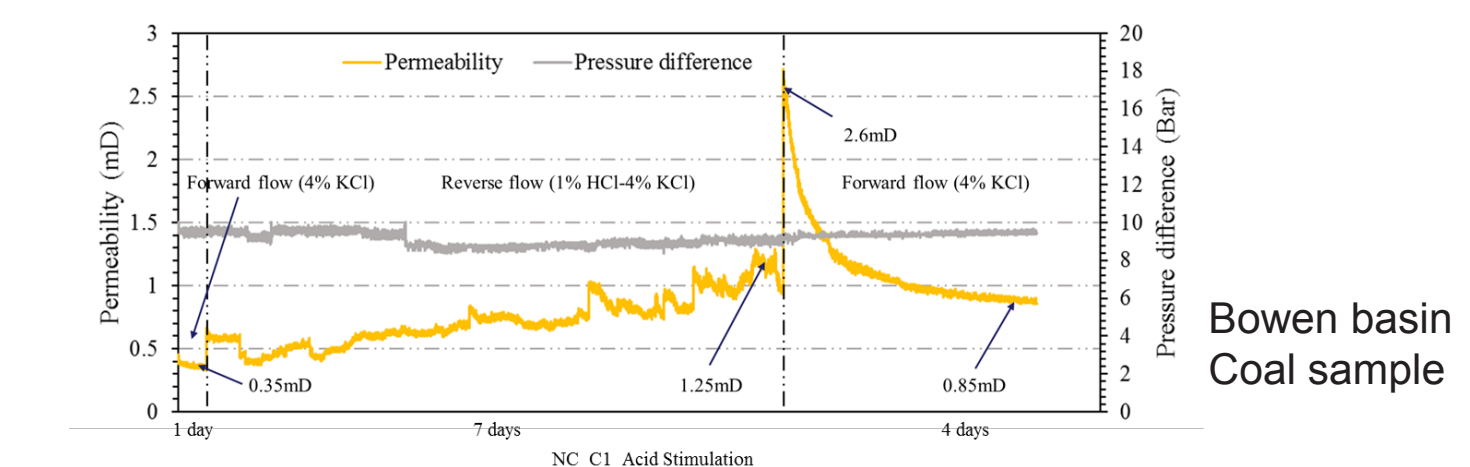
### ➤ Cleat Flow Cell

Artificial coal cleat aperture could be dilated especially in Surat Basin coal. It means the coal etching is dominant.

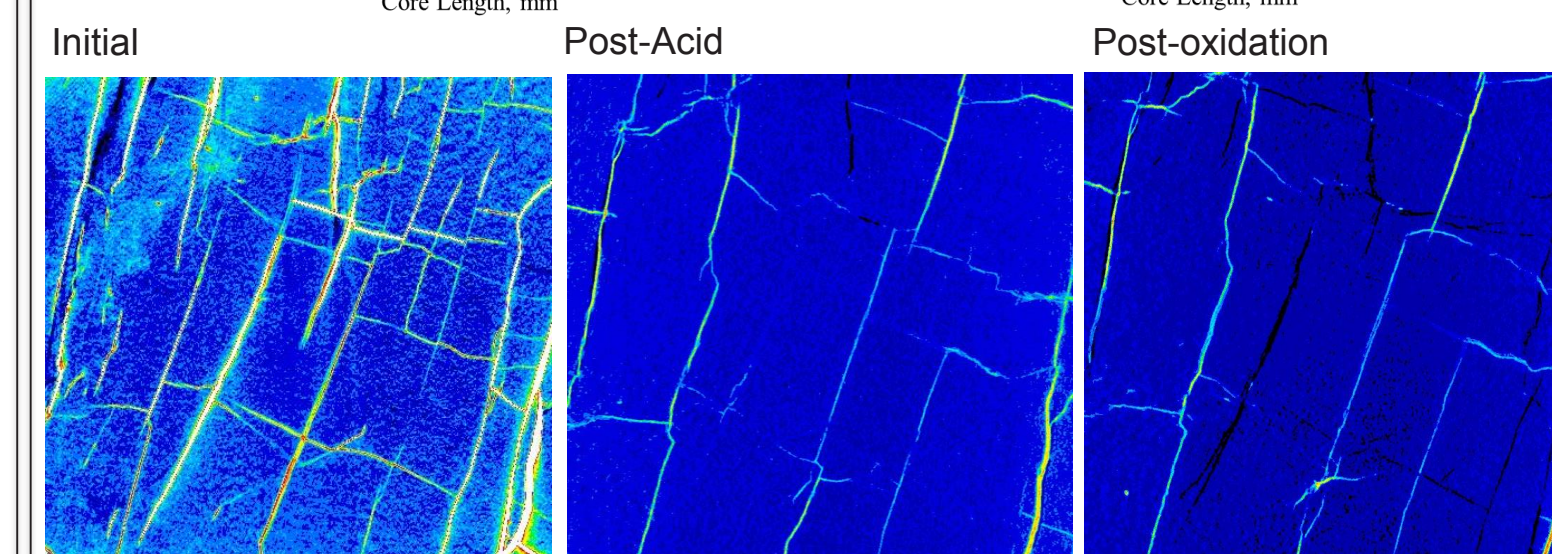
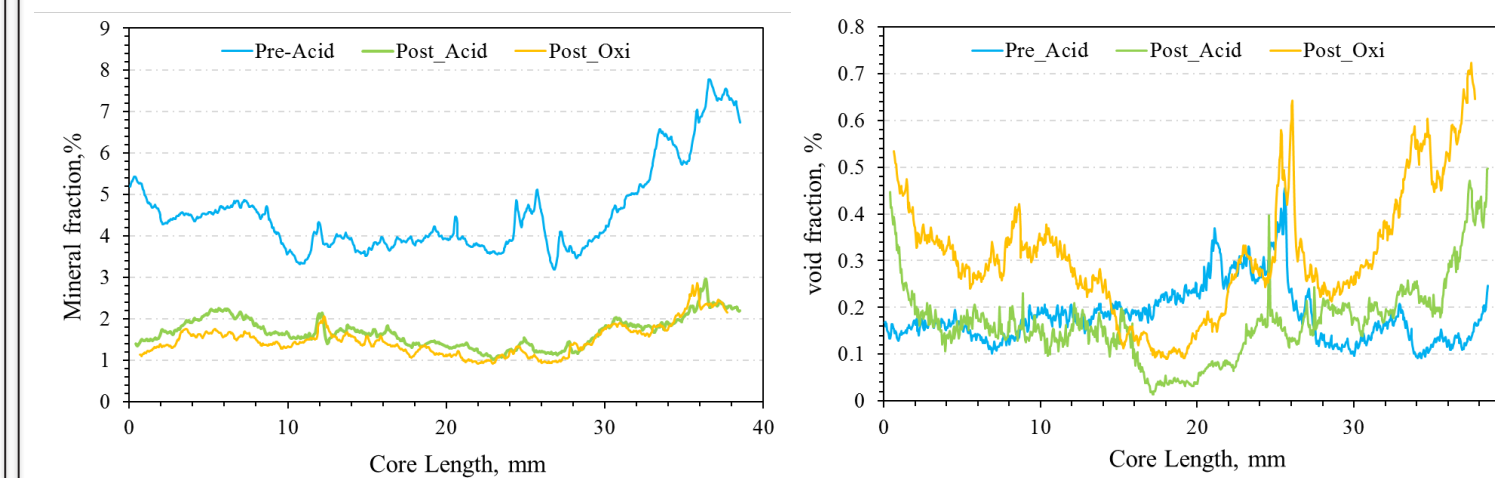


### ➤ Permeability & CT scanning

Horizontal permeability test showed acid stimulation could increase coal permeability but the effect of oxidant stimulation remained unclear.



CT analysis demonstrated that acid stimulation could dissolve the minerals in cleats and oxidant could dilate the cleats.



## CONCLUSION

- NaClO prefers to react with Surat Basin coal than Bowen Basin coal.
- Porosity in both coals was increased after oxidation. SEM results showed new pores generated on S coal surface.
- Artificial coal cleat aperture could be dilated especially in Surat basin coal. It means the coal etching is dominant, rather than coal swelling.
- Acid stimulation could increase coal permeability but the oxidation effect is unclear.

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