# Influence and sensitivity study of matrix shrinkage and swelling on enhanced coalbed methane production and $CO_2$ sequestration with mixed gas injection

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**Abstract**

Matrix compressibility, shrinkage and swelling can cause profound changes in porosity and permeability of coalbed during gas sorption and desorption. These factors affect the distribution of pressure, methane production and $CO_2$ sequestration.

This paper compares the effects of cleat compression and matrix shrinkage and swelling models with the injection of different compositional gas mixtures ($CO_2$ and $N_2$). It shows that well performance, pressure distribution and properties of the seam are strongly affected by matrix shrinkage and swelling. Matrix shrinkage and swelling also affects net present value of the enhanced coalbed methane recovery scheme. In order to select the best enhanced coalbed methane recovery schemes, economic evaluation and sensitivity studies are necessary.

**Keywords:** Shrinkage and swelling, Mixed gas injection, Economic evaluation, Sensitivity study

## 1. INTRODUCTION

Permeability is recognized as one of the most important parameters for coalbed methane (CBM) production. Both porosity and permeability of coalbed change during primary and enhanced methane recovery, due to changes in stresses of coalbed. Gayer

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