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## Constant-current electroosmotic dewatering of superabsorbent hydrogel (Article)

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### Abstract

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The electroosmotic dewatering (EOD) behaviors of gelatinous materials, such as superabsorbent hydrogels or swelling clay, are discussed. The apparent liquid velocity through the materials can be represented in terms of effective-osmotic, electroosmotic and swelling pressure gradients. Taking the creep deformation of the materials into consideration and assuming that the mechanical properties of the materials can be represented by the Terzaghi-Voigt combined model, the basic differential equation expressing EOD of gelatinous materials is solved. The progress of EOD is represented by an average consolidation ratio  $U_c$  as in mechanical expression. The agreement between calculated and experimental  $U_c$  is satisfactory when the creep deformation of the material is considered. The disagreement between theory and experiment in the latter part of EOD may be due to the change of the property of hydrogel caused by dissolution of Fe(III) from stainless steel electrode. © 2012 Elsevier B.V.

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Effective osmotic pressure gradient Electroosmotic dewatering Superabsorbent gel Swelling pressure gradient

### Indexed keywords

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Creep Dewatering Differential equations Electroosmosis Hydrogels Materials  
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