Advances in Mathematical Sciences and Applications
Vol. 33, No. 2 (2024), pp. 501–524

GAKKOTOSHO
TOKYO JAPAN

SOLVABILITY OF THE MOISTURE TRANSPORT MODEL FOR POROUS MATERIALS

Akiko Morimura*
Department of Mathematical and Physical Science, Graduate School of Science,
Japan Women's University
2-8-1 Mejirodai, Bunkyoku, Tokyo, 112-8681, Japan
(E-mail: m1716096ma@ug.jwu.ac.jp)

and

Toyohiko Aiki
Department of Mathematical and Physical Science, Faculty of Science,
Japan Women's University
2-8-1 Mejirodai, Bunkyoku, Tokyo, 112-8681, Japan
(E-mail: aikit@fc.jwu.ac.jp)

Abstract. We consider an initial and boundary value problem invoked from the mathematical model for moisture transport in porous materials. Because of the difficulty appearing in the boundary condition, we have changed it and obtain the nonlinear parabolic equation with the nonlinear boundary condition in the one-dimensional interval. The main result of this paper is to prove existence and uniqueness of solutions to the problem by applying the standard fixed point theorem argument.

*Corresponding author
Communicated by Editors; Received February 17, 2024
This work is supported by JSPS KAKENHI Grant Number 22K03377 and partially supported Ebara Corporation.
AMS Subject Classification: 35K57, 35K55, 76S05.
Keywords: Porous material, elliptic-parabolic equation, fixed point theorem.