

Accepted Manuscript

Laser-Induced Alteration of Microstructural and Microscopic Transport Properties in Porous Materials: Experiment, Modeling and Analysis

Keerti Vardhan Sharma, Olga M.O. de Araujo, Joao V. Nicolini, Robert Straka, Helen C. Ferraz, Ricardo T. Lopes, Frederico Wanderley Tavares



PII: S0264-1275(18)30463-5
DOI: doi:[10.1016/j.matdes.2018.06.002](https://doi.org/10.1016/j.matdes.2018.06.002)
Reference: JMADE 3972
To appear in: *Materials & Design*
Received date: 28 December 2017
Revised date: 1 June 2018
Accepted date: 1 June 2018

Please cite this article as: Keerti Vardhan Sharma, Olga M.O. de Araujo, Joao V. Nicolini, Robert Straka, Helen C. Ferraz, Ricardo T. Lopes, Frederico Wanderley Tavares , Laser-Induced Alteration of Microstructural and Microscopic Transport Properties in Porous Materials: Experiment, Modeling and Analysis. *Jmade* (2018), doi:[10.1016/j.matdes.2018.06.002](https://doi.org/10.1016/j.matdes.2018.06.002)

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Laser-Induced Alteration of Microstructural and Microscopic Transport Properties in Porous Materials: Experiment, Modeling and Analysis

Keerti Vardhan Sharma^a, Olga M. O. de Araujo^b, Joao V. Nicolini^a, Robert Straka^c, Helen C. Ferraz^a, Ricardo T. Lopes^b, Frederico Wanderley Tavares^{a,d,*}

^a*Programa de Engenharia Química/COPPE- Universidade Federal do Rio de Janeiro, CEP: 24210-240, Rio de Janeiro, Brazil*

^b*Programa de Engenharia Nuclear/COPPE- Universidade Federal do Rio de Janeiro, CEP: 24210-240, Rio de Janeiro, Brazil*

^c*Department of Heat Engineering and Environment Protection, Faculty of Metals Engineering and Industrial Computer Science, AGH University of Science and Technology, Al. Mickiewicza 30, 30-059, Krakow, Poland*

^d*Escola de Química, Universidade Federal do Rio de Janeiro, CEP:21949-900, Rio de Janeiro, Brazil*

Abstract

Porous materials are of great importance in various industrial applications. Microscopic modifications in the pore structures of these materials can change their functional behavior. We treat Indiana limestone by lasers to modify its pore structures microscopically. Microcomputed tomography (micro-CT) of the treated samples reveal that pulsed Nd:YAG laser with energy 330 mJ increases open porosity of limestone by 15% and almost doubles the total porosity. This laser increases the limestone pore connectivity by 460%. High power CO_2 laser increases the open porosity by 20% but it reduces the pore

*Corresponding authors

Email address: tavares@eq.ufrj.br (Frederico Wanderley Tavares)

Download English Version:

<https://daneshyari.com/en/article/7216890>

Download Persian Version:

<https://daneshyari.com/article/7216890>

[Daneshyari.com](https://daneshyari.com)