



EI COMPENDEX  
核心期刊

ISSN 0459-1879  
CN 11-2062/O3

# 力学学报

Chinese Journal of Theoretical and Applied Mechanics

第 52 卷 第 3 期 Vol. 52 No. 3

2020



中国力学学会 主办  
中国科学院力学研究所  
力学学报期刊社 出版

万方数据



力学学报 (双月刊)  
Chinese Journal of Theoretical and  
Applied Mechanics

1957 年 创刊  
2020 年  
第 52 卷 第 3 期

目 次

研究综述

泡沫铝本构行为研究进展.....贾 然 赵桂平 (603)

环境力学专题

环境力学专题序.....黄 宁 (623)

基于巴西盘试验的海冰拉伸强度研究.....陈晓东 崔海鑫 王安良 季顺迎 (625)

大风区铁路沿线挡风墙积沙机理及优化措施的风洞实验研究.....辛国伟 黄 宁 张 洁 (635)

梯级溃坝洪水洪峰增强机制.....黄 灿 刘青泉 王晓亮 (645)

高雷诺数湍流风场大涡模拟的并行直接求解方法.....包 芸 习令楚 (656)

边坡稳定分析的虚功率法.....吴梦喜 杨家修 湛正刚 (663)

粗糙床面物质交换特性及其主导机制实验研究.....樊靖郁 陈春燕 赵 亮 王道增 (673)

沙丘背风侧不同铁路结构形式对风沙环境的适应性分析.....王文博 黄 宁 顿洪超 (680)

再悬浮底泥中非吸附性污染物释放的数值模拟.....程鹏达 朱心广 冯 春 王晓亮 (689)

非均匀积污下高压绝缘子电位及电场分布特性.....毛 东 唐秋明 高 强 (698)

基于碰撞模型的斜坡滚石颗粒速度预测.....魏新容 段绍臻 孙金龙 王文达 (707)

流体力学

细长椭球体在水中自由下落的运动特性实验研究.....詹 军 张 杰 阳倦成 倪明玖 (716)

固体颗粒对半球扰动尾迹影响的实验研究.....张艳涛 孙 姣 高天达 范 赢 陈文义 (728)

固体力学

$\text{La}_{30}\text{Ce}_{30}\text{Al}_{15}\text{Co}_{25}$  金属玻璃应力松弛行为.....陈迎红 王云江 乔吉超 (740)

基于一类非局部宏-微观损伤模型的裂纹模拟.....卢广达 陈建兵 (749)

平纹机织碳纤维复合材料的多尺度随机力学性能预测研究.....许 灿 朱 平 刘 钊 陶 威 (763)

结构冲击畸变问题的直接相似方法研究.....王 帅 徐 绯 代 震 刘小川 李肖成 杨磊峰 惠旭龙 (774)

基于能量密度等效的超弹性压入模型与双压试验方法.....张希润 蔡力勋 陈 辉 (787)

预应变对钆中子辐照高纯铝拉伸性能的影响.....叶想平 段志伟 俞宇颖 耿华运 李雪梅 胡 凌 蔡灵仓 刘仓理 (797)

动力学与控制

在轨组装空间结构面向主动控制的动力学建模.....王恩美 郭树楠 吴志刚 (805)

两关节压力驱动柔性仿生机器鱼的设计与仿真.....教 柳 张保成 张开升 赵 波 (817)

生物、工程及交叉力学

天然气水合物开发多物理场特征及耦合渗流研究进展与建议.....李淑霞 郭尚平 陈月明 张宁涛 武迪迪 (828)

骨陷窝-骨细胞形状和方向对骨单元内液体流动行为的影响.....于伟伦 武晓刚 李朝鑫 孙玉琴 张美珍 陈维毅 (843)

悬浮态上皮细胞粘附的力学-化学耦合模型及数值模拟.....冯世亮 周吕文 吕守芹 龙 勉 (854)

不同加载边界下混凝土巴西劈裂过程及强度的 DIC 实验分析.....徐纪鹏 董新龙 付应乾 俞鑫炉 周风华 (864)

土剪破坏次声监测试验研究.....陈 乔 张 阔 陈吉龙 张少杰 吕 君 周儒夫 韦方强 (877)

流变岩体中让压支护作用下隧道力学行为研究.....吴 奎 邵珠山 秦 溯 (890)

# Chinese Journal of Theoretical and Applied Mechanics

(Bimonthly)

Vol. 52, No. 3, 2020

## CONTENTS

### Research Review

Progress in constitutive behavior of aluminum foam ..... Jia Ran Zhao Guiping (603)

### Theme Articles on “Environmental Mechanics”

Preface to the special issue of Environmental Mechanics ..... Huang Ning (623)

Experimental study on sea ice tensile strength based on Brazilian tests ..... Chen Xiaodong Cui Haixin Wang Anliang Ji Shunying (625)

Wind-tunnel experiment on sand deposition mechanism and optimal measures of wind-break wall along railway in strong wind area .....  
..... Xin Guowei Huang Ning Zhang Jie (635)

Mechanism of peak discharge enhancement of cascade dam break floods ..... Huang Can Liu Qingquan Wang Xiaoliang (645)

Parallel direct method of LES for turbulent wind field with high Reynolds number ..... Bao Yun Xi Lingchu (656)

A virtual power slope stability analysis method ..... Wu Mengxi Yang Jiaxiu Zhan Zhenggang (663)

Experimental study on interfacial mass exchange process and its dominant mechanism for rough bed .....  
..... Fan Jingyu Chen Chunyan Zhao Liang Wang Daozeng (673)

Analysis of wind-sand movement over sand dune with different railway forms downstream ..... Wang Wenbo Huang Ning Dun Hongchao (680)

Numerical simulation on the release of non-adsorption pollutants during the sediment resuspended .....  
..... Cheng Pengda Zhu Xinguang Feng Chun Wang Xiaoliang (689)

Distribution characteristics of electric potential and electric field along HV insulators under non-uniform contamination .....  
..... Mao Dong Tang Qiuming Gao Qiang (698)

Velocity prediction of slope rolling stone particle based on collision model ..... Wei Xinrong Duan Shaozhen Sun Jinlong Wang Wenda (707)

### Fluid Mechanics

Experimental study on the kinematics of freely falling prolate sphere in the water ..... Zhan Jun Zhang Jie Yang Juancheng Ni Mingjiu (716)

Experimental investigation on the effect of particles on the wake of hemispheric disturbance .....  
..... Zhang Yantao Sun Jiao Gao Tianda Fan Ying Chen Wenyi (728)

### Solid Mechanics

Stress relaxation of  $\text{La}_{30}\text{Ce}_{30}\text{Al}_{15}\text{Co}_{25}$  metallic glass ..... Chen Yinghong Wang Yunjiang Qiao Jichao (740)

Cracking simulation based on a nonlocal macro-meso-scale damage model ..... Lu Guangda Chen Jianbing (749)

Research on multiscale stochastic mechanical properties prediction of plain woven carbon fiber composites .....  
..... Xu Can Zhu Ping Liu Zhao Tao Wei (763)

A direct scaling method for the distortion problems of structural impact .....  
..... Wang Shuai Xu Fei Dai Zhen Liu Xiaochuan Li Xiaocheng Yang Leifeng Xi Xulong (774)

Hyperelastic indentation models and the dual-indentation method based on energy density equivalence .....  
..... Zhang Xirun Cai Lixun Chen Hui (787)

The effects of pre-strain on tensile properties of neutron irradiation high-purity aluminum .....  
..... Ye Xiangping Duan Zhiwei Yu Yuying Geng Huayun Li Xuemei Hu Ling Cai Lingcang Liu Cangli (797)

### Dynamics, Vibration and Control

Active-control-oriented dynamic modelling for on-orbit assembly space structure ..... Wang Enmei Wu Shunan Wu Zhigang (805)

Design and simulation of two-joint pressure-driven soft bionic fish ..... Jiao Liu Zhang Baocheng Zhang Kaisheng Zhao Bo (817)

### Biomechanics, Engineering and Interdisciplinary Mechanics

Advances and recommendations for multi-field characteristics and coupling seepage in natural gas hydrate development .....  
..... Li Shuxia Guo Shangping Chen Yueming Zhang Ningtao Wu Didi (828)

Effect of osteocyte-lacunae shape and direction on the fluid flow behavior in osteon .....  
..... Yu Weilun Wu Xiaogang Li Chaoxin Sun Yuqin Zhang Meizhen Chen Weiyi (843)

Mechanochemical coupling model and numerical simulation for cell-cell adhesion in suspended epithelial cells .....  
..... Feng Shiliang Zhou Lüwen Lü Shouqin Long Mian (854)

Experimental analysis of process and tensile strength for concrete Brazilian splitting test with different loading boundaries by DIC method .....  
..... Xu Jipeng Dong Xinlong Fu Yingqian Yu Xinlu Zhou Fenghua (864)

Experimental study on infrasound monitoring during soil shear failure .....  
..... Chen Qiao Zhang Kuo Chen Jilong Zhang Shaojie Lü Jun Zhou Rufu Wei Fangqiang (877)

Investigation on the mechanical behavior of tunnel supported by yielding supports in rheological rocks ..... Wu Kui Shao Zhushan Qin Su (890)