首都师范大学学报(自然科学版)

Shoudu Shifan Daxue Xuebao(Ziran Kexue Ban)

2026年4月　　第47卷　第2期

目　　次

50周年刊庆特邀:地理时空信息技术应用

基于高清遥感影像的城区常绿植被提取方法 ……李照芊,王艳慧(1)

基于视觉感知的行人密接行为识别 ……李丹丹,张贺林,邓　悦,张　琳,贺日兴(8)

50周年刊庆特邀:AI赋能自然科学研究

机器学习在环境科学与工程中的应用进展 ……张玉虎,李　洁(18)

基础数学研究

基于Psoset结构的Galois伴随 ……刘　睿,耿　俊(28)

具有2个卷积核和Hilbert核的奇异积分方程的可解性 ……王洪泉,张雯雯,类延鑫,杨经芃,李平润(32)

数论函数方程$\varphi_e(n)=Z(SL(n))(e=12)$的可解性 ……高　丽,李欣欣(38)

从中国剩余定理看线性空间关于线性变换的分解 ……林开亮,王　丽(46)

光学与量子信息科学

高Q和高灵敏度太赫兹超表面传感器研究 ……安明明,石薇琳,郝纪轩,赵国忠(50)

烟火药配方对连续烟火药泵浦Nd:YAG激光器输出性能的影响 ……熊森华,陈喜芳,易　早,郑涪升(58)

纤端法布里-珀罗微腔仿生植物导管空化发声机制研究 ……徐　奥,冯胜飞(66)

可持续化学与绿色合成

高能泡排在榆林气田水平气井的应用研究 ……王　磊,何顺安,刘　辉,常　霞,郭海海,王陆瑶(74)

高质量教育体系建设

求解常系数偏微分方程的亥维赛算子法 ……刘继涛,王　兢(82)

吡啶离子液体绿色化学催化剂设计及教学实践:乙酸乙酯合成实验中的创新能力培养 ……

……张璐莹,卢思嫄,薛雨婷,杨　莹,王　前,方　玉,李　凯,郑婷婷(86)

从“传知”到“育德”:物理化学课程如何“育才造士”的协同路径探索 ……常子彦,徐珍珍,张婷祷(94)

Journal of Capital Normal University

(Natural Science Edition)

Vol.47 No.2 Apr. 2026

Contents

50th Anniversary of the Journal: Application of Geospatical-Temoporal Information Technology

Method for extracting evergreen vegetation in urban areas based on high-resolution remote sensing images ····· LI Zhaoqian, WANG Yanhui(1)

Visual perception-based identification of pedestrians' close contact behaviors ····· LI Dandan, ZHANG Helin, DENG Yue, ZHANG Lin, HE Rixing(8)

50th Anniversary of the Journal: AI for Science

Advances in the applications of machine learning in environmental science and engineering ····· ZHANG Yuhu, LI Jie(18)

Research of Basic Mathematics

Galois adjunction based on Psoset ····· LIU Rui, GENG Jun(28)

Solvability of singular integral equations with two convolution kernels and Hilbert kernel ····· WANG Hongquan, ZHANG Wenwen, LEI Yanxin, YANG Jingpeng, LI Pingrun(32)

The solvability of arithmetic function equation $\varphi_e(n)=Z(SL(n))(e=12)$ ····· GAO Li, LI Xinxin(38)

Decomposition theorem from the viewpoint of Chinese remainder theorem ····· LIN Kailiang, WANG Li(46)

Optics and Quantum Information Science

Design and analysis of high-Q and high-sensitivity terahertz metasurface sensors ····· AN Mingming, SHI Weilin, HAO Jixuan, ZHAO Guozhong(50)

Influence of pyrotechnic mixture formula on the output performance of continuous pyrotechnic- pumped Nd: YAG lasers ····· XIONG Senhua, CHEN Xifang, YI Zao, ZHENG Fusheng(58)

Mechanism of cavitation-acoustic emission in biomimetic plant vessels with fiber-tip Fabry-Pérot microcavities ····· XU Ao, FENG Shengfei(66)

Sustainable Chemical and Green Synthesis

High energy foaming technique on horizontal wells in Yulin gas field ····· WANG Lei, HE Shunan, LIU Hui, CHANG Xia, GUO Haihai, WANG Luyao(74)

Construction of High-quality Education System

Heaviside operator method for solving partial differential equations with constant coefficients ····· LIU Jitao, WANG Jing(82)

Design and teaching practice of pyridine ionic liquid green chemical catalysts: cultivation of innovation ability in the synthesis experiment of ethyl acetate ····· ZHANG Luying, LU Siyuan, XUE Yuting, YANG Ying, WANG Qian, FANG Yu, LI Kai, ZHENG Tingting(86)

From knowledge to virtue: how Physical Chemistry Courses nurture talent and build scholars ····· CHANG Ziyan, XU Zhenzhen, ZHANG Tingyi(94)