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2018年11月12日

## ▶ 前沿资讯

### 1. 西班牙发布《西中科技合作》研究报告

**简介:**日前,西班牙著名智库——埃尔卡诺皇家研究院就必须加强西中科技关系发布《西中科技合作》研究报告。报告认为,科技关系已成为两国外交关系的重要基础,双边科技创新合作将助力两国发展利益,且潜力巨大。报告深入解读近年来中国科技创新投入产出、队伍建设、战略规划、体制改革及《中国制造2025》,聚焦中国市场准入、外商投资及自贸区负面清单调整举措,剖析两国科研创新及人才交流合作现状,指明双边合作的正确路径是:找准互补互惠契合点,发挥双方比较优势,挖掘合作更大潜能。报告在梳理欧中关系框架时强调,西班牙要紧抓“欧中2020战略合作议程”达成的能源、航空航天、城市化、生物多样性领域合作举措;欧盟“地平线2020”计划与中国在农业与食品、生物技术、生态运输、能源、健康等优先领域的合作共识;以及“一带一路”机遇。也要直面中国与欧洲其他国家竞争和“全球技术冷战”保护主义等风险挑战。报告呼吁西班牙要抢抓中国“十三五”规划中突出绿色技术、环保汽车、智慧城市、健康、农食业的发展契机,增加与中国在民用空间基础设施、新一代信息网络、集成电路、新材料、生物医学、航空发动机和燃气轮机、国防研究诸领域的合作。报告指出,尽管双边科技合作体制框架业已建立并取得积极进展,但仍有待完善。并给出结论性建议:一是在互补与互惠基础上,从国家层面制定两国科技创新合作整体战略,设立双边科技创新合作资助基金,加强合作的政策引导及其央地统筹协调,建立起切实有效的政府间合作机制,以推动合作务实前行。二是在欧洲科技创新政策框架内,由新成立的科学、创新和大学部推动建立体制框架,在西驻华使馆增设科技外交官职位,促进双方科技人员交往,扩大科研合作;充实西产业技术发展中心驻华力量,紧跟中国区域经济发展步伐,拓展技术创新合作空间。三是全面审视西、中和拉美三角关系演变发展新趋势,探索开创西一中一拉三方科技创新合作新局面。埃尔卡诺皇家研究院是西班牙国际与战略问题研究权威机构,成立于2001年,以私营基金会形式运作,西班牙国王任名誉主席。董事会由外交政策知名人士、资助基金会的企业和有关政府部门代表组成。

**来源:**科技部

**发布日期:**2018-10-18

**全文链接:**<http://agri.ckcest.cn/file1/M00/02/9C/Csgk0FvkOjiAV00-AAe9P8Lle7U602.pdf>

## ▶ 学术文献

### 1 . Dynamic rerouting of a fleet of vehicles in agricultural operations through a Dynamic Multiple Depot Vehicle Routing Problem representation (通过动态多车场车辆路径问题表示,对农业作业中的车队进行动态重新布置)

**简介:** Agricultural field work within even a single field is a dynamic, complex process, and farm managers are often forced to deviate from their initial plans for working a field as work proceeds. Unexpected field conditions or machinery management challenges can require reallocation and rescheduling of the paths that create the in-field route for each vehicle. The goal of this project was to develop a method for applying the Vehicle Routing Problem (VRP)

that enables dynamic recalculation of the routes. To that end, a combination of Dynamic VRP and Multi-Depot VRP was employed to represent the state of field, available vehicles in the fleet working the field, and the current progress of the field work. This dynamic routing method was then tested in simulations of various common scenarios that would often require rerouting of vehicles. The results revealed the impact of the new routes is dependent on the specifics of the event that necessitated the rerouting. When a vehicle was added to the fleet working the field, the updating procedure was able to use that vehicle to reduce completion times. When vehicles operate at unexpectedly fast or slow rates, recalculating the routes can improve field work parameters, but only if the change in work rates caused a significant deviation in field work progress. The procedure handled increases in the area coverage with most field work parameters varying only slightly from initial levels. This work illustrated the possibility to update field routes for a fleet of vehicles during field operations.

来源: BIOSYSTEMS ENGINEERING

发布日期: 2018-05-21

全文链接:

<http://agri.ckcest.cn/file1/M00/02/9C/Csgk0FvkObOAVzSKAECuqXEutUs039.pdf>

## **2 . Tunable and quantitative serial dilution on multi-channel miniaturized microfluidic electrochemical platform (可调定量连续稀释的多通道微型化微流体电化学平台)**

简介: Electrochemical technique has been widely applied in trace analysis due to high sensitivity, low detection limit, low time cost and simple instrumentation. Precise concentration gradients of biomolecules and chemicals play significant roles in electrochemical measurements for disease diagnosis, environmental monitoring and healthcare. Conventional approaches to generating gradients are generally complicated and time-cost with unpredictable and uncontrollable profiles over time and space. This paper presents a multi-channel miniaturized microfluidic electrochemical platform featuring tunable and quantitative serial dilution by integrating with microfluidic device and multichannel electrochemical chip. By continuously sharing and diluting samples from prior channels, this platform can effectively reduce sample cost with only one outlet required. To implement serial and quantitative dilution on the microfluidic device, the microfluidic structure was analogous to an electrical circuit and designed accordingly. The function of tunable and quantitative serial dilution was validated with COMSOL simulation. Both the microfluidic device and the multichannel electrochemical chip were fabrication by standard photolithography microfabrication. This miniaturized electrochemical platform was achieved by the alignment and bonding of the microfluidic device and the electrochemical chip. The platform with four independent channels was tested in potassium ferricyanide/ferrocyanide to validate the performance and serial dilution functionality in electrochemical sensing. Experimental results were demonstrated and well matched simulation results. The platform featuring tunable and quantitative serial dilution provides a promising approach to generating precise and tunable gradients that can enable fast calibration in electrochemical sensing.

来源: SENSORS AND ACTUATORS B-CHEMICAL

发布日期:2018-08-02

全文链接:

<http://agri.ckcest.cn/file1/M00/02/9C/Csgk0FvkOL6ALW9iABlg98STrqQ436.pdf>

### **3 . High-performance nanogap electrode-based impedimetric sensor for direct DNA assays (高性能纳米板电极阻抗传感器用于直接DNA检测)**

**简介:** The rapid and sensitive detection of pathogen DNA (Deoxyribonucleic acid) would be essential for diagnosis and appropriate antibiotic treatment time. Herein, we report a novel direct DNA detectable impedimetric sensor. Direct assay of the amplified target DNA (mecA gene from methicillin-resistant Staphylococcus aureus (MRSA)) was performed using the PCR (polymerase chain reaction) product without any purification. Even though there are lots of PCR reagents and excess salts in sample PCR product, the nanogap electrode-based impedimetric sensor was able to detect DNA amplification fast in 5th PCR cycle which had 260 fM mecA gene in sample originally. The 70 nm gap electrode sensor yielded over 20% signal increase at the 5th PCR cycle and the impedance change grew up to about 60% at 25th in case of sample with 260 fM mecA gene template originally. The increased concentration of target DNA template led to the rise in impedance change such as 60% up at 5th and 120% up at 25th cycle with 260 pM, respectively. It is very outstanding result as compared with the traditional PCR agarose gel. Besides, it is 7-fold superior sensitivity to the microgap electrode. Furthermore, genomic DNA sample extracted from MRSA was detected rapidly. The nanogap electrode-based impedimetric sensor could be a good candidate for a rapid, sensitive, and low-cost electrical biosensor for DNA characterization in diagnostics and disease monitoring.

**来源:** BIOSENSORS & BIOELECTRONICS

发布日期:2018-07-26

全文链接:

<http://agri.ckcest.cn/file1/M00/02/9C/Csgk0FvkN-KAcHVQABC9JGbEqJA839.pdf>

## 专业会议

### **1 . AI: Intelligent machines, smart policies (人工智能: 智能机器, 智能政策)**

**简介:** 本会议纪要反映了2017年10月26日至27日在巴黎举行的经合组织“人工智能: 智能机器, 智能政策”会议上的讨论。在讨论了人工智能(AI)研究的现状——尤其是“机器学习”之后, 演讲者阐述了人工智能在科学发现、卫星数据分析和音乐创作等领域为改善经济和社会提供的机遇。人们普遍认为, 人工智能的快速发展需要所有利益相关者参与的国家国际政策框架。本次会议讨论的重点是政策需要促进人工智能系统的采用, 促进创新和增长, 帮助应对全球挑战, 促进就业和技能发展, 同时建立适当的保障措施, 确保人工智能系统以人为本, 广泛造福人类。其他的关键问题有透明度和监督、算法歧视、侵犯隐私、新责任、义务和安全问题等。

来源: oecd-ilibrary

发布日期: 2018-08-02

全文链接:

<http://agri.ckcest.cn/file1/M00/02/9C/Csgk0FvkO5eAcSPnABLMU59iYIY544.pdf>