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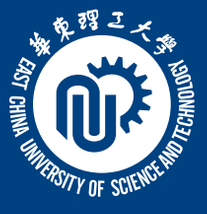

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Journal of East China University of Science and Technology

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Papers

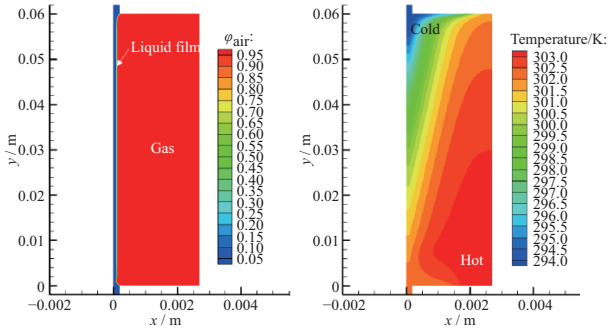
· Chemical Engineering ·

Numerical Simulation of Liquid Hydrodynamics and Gas-Liquid Heat Transfer Behaviors in a Falling Film Microchannel

YANG Yongchang, ZHANG Tao, CHEN Siyuan, TANG Shengwei

Journal of East China University of Science and Technology, 2019, 45(2): 189-196.

A simulation method to study the liquid hydrodynamics and gas-liquid heat transfer characteristics in a falling film micro-reactor (FFMR) is proposed. Volume of fluid (VOF) method is adopted to investigate in detail the flow behaviors of the film. Effects of the gas inlet velocity, temperature and liquid flowrates on heat transfer coefficient are studied.

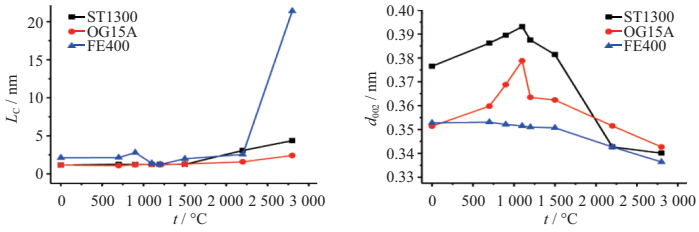


Structure Changes and Electrochemical Performance of Activated Carbon Fibers during Heat-treatment

LI Xiaohui, MA Cheng, JIANG Xinnan, WANG Jitong, QIAO Wenming, LING Licheng

Journal of East China University of Science and Technology, 2019, 45(2): 197-205.

After treated under different temperatures from 700 ℃ to 2 800 ℃, the pore structure and microstructure of ACFs changed significantly. When the temperature was higher than 1 200 ℃, the interlayer spacing decreased, while the crystallite size and the degree of graphitization increased gradually.

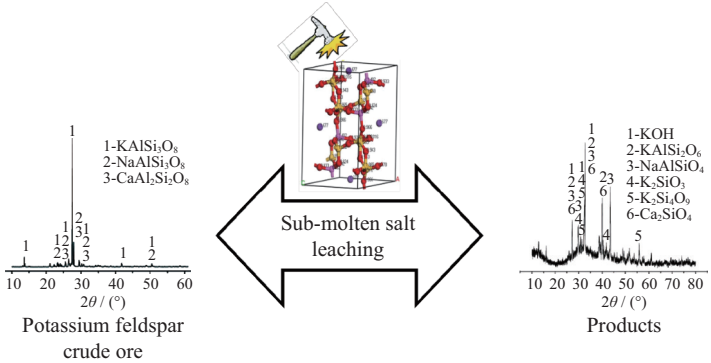


Leaching Process of Potassium Feldspar by Sub-Molten Salt at Low Temperature

JIANG Wei, LUO Mengjie, LIU Chenglin, LI Ping, YU Jianguo

Journal of East China University of Science and Technology, 2019, 45(2): 206-215.

Both thermodynamic analysis and experimental results demonstrated that the concentrated alkali solution at sub-molten salt state had a high chemical reaction activity, which could decompose potassium feldspar crude ore at 230 °C. The unreacted shrinking core model with the surface chemical reaction control could predict the leaching kinetics of potassium feldspar crude ore by KOH sub-molten salt.



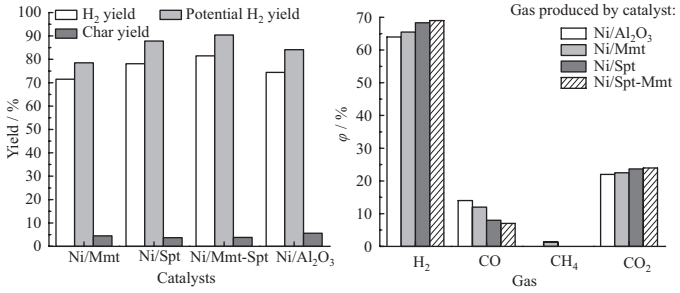
万方数据

Ni/Modified Montmorillonite-Sepiolite as Catalyst for Hydrogen Production from Bio-oil Steam Reforming

CUI Yu, ZHANG Suping, CAI Qinjie, LIU Shiqi

Journal of East China University of Science and Technology, 2019, 45(2): 216-223.

The montmorillonite was modified by alkali treating. The Ni/Mmt-Spt catalyst was prepared by alkali-treated montmorillonite-sepiolite (Mmt-Spt) as support and nickel as the active ingredient. And the impact of Ni/Mmt-Spt for the hydrogen yield and char yield in hydrogen production from bio-oil steam reforming was inspected.

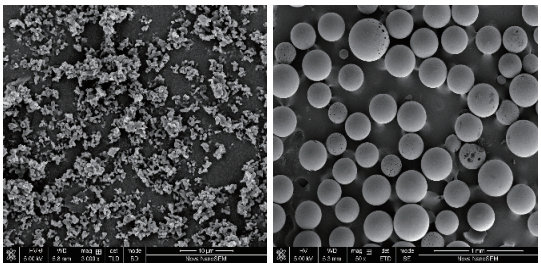


Spherical Crystallization Process of Multicomponent Acylated Spiramycin

LAN Yueshan, CHEN Kui, WU Bin, JI Lijun, WU Yanyang, ZHU Jiawen

Journal of East China University of Science and Technology, 2019, 45(2): 224-230.

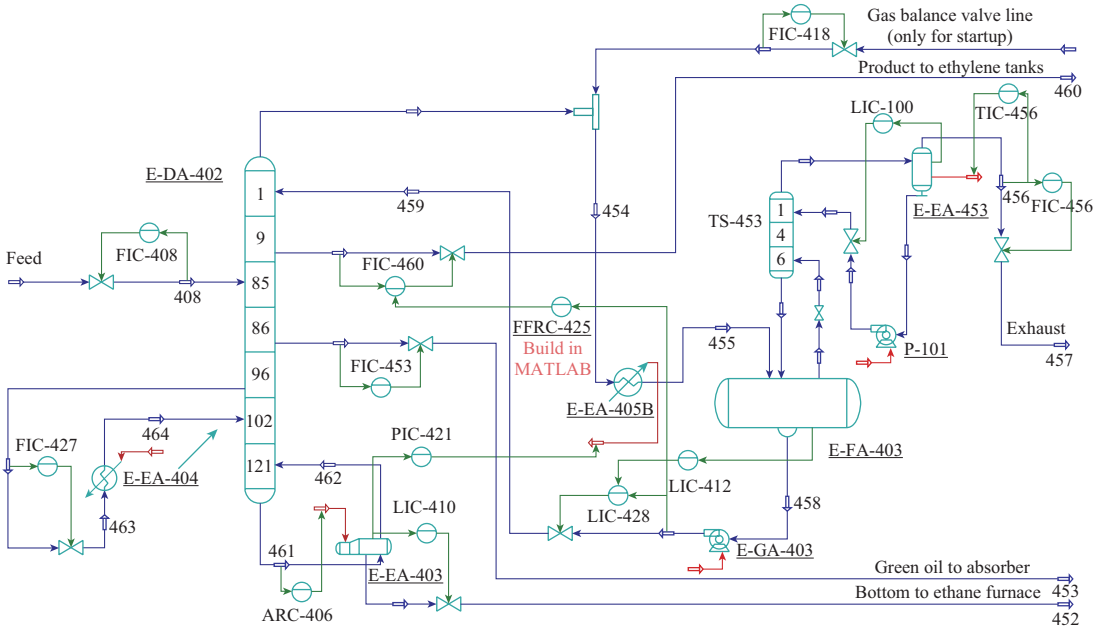
The irregular powder crystal of acylated spiramycin was agglomerated into uniform spherical crystal particles by quasi-emulsion solvent diffusion method. The product attained a larger average diameter and a more homogeneous size distribution is compared with raw materials.



Dynamic Simulation and Optimization of Ethylene Distillation Column in Startup Process

YE Zhencheng, GU Jianxing

Journal of East China University of Science and Technology, 2019, 45(2): 231-240.



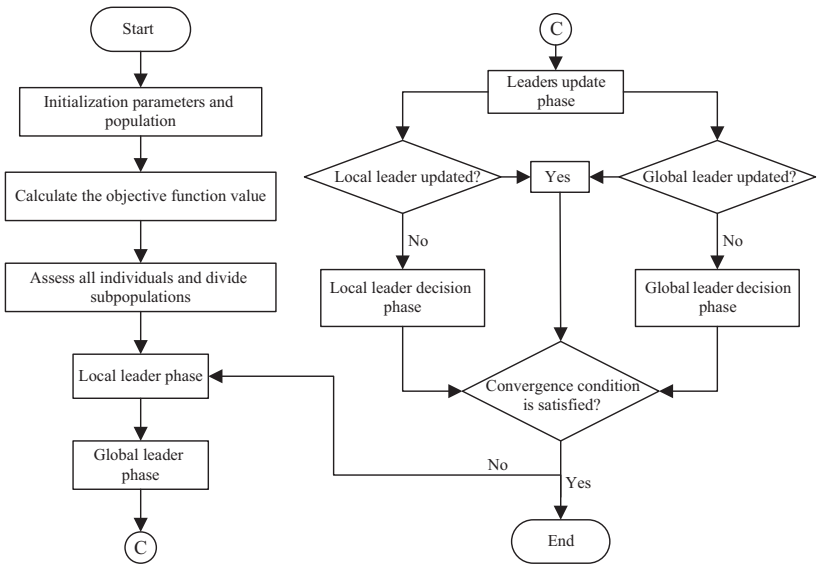
Dynamic simulation and optimization of ethylene distillation column (EDC) in its startup process is reported. EDC model built in Aspen HYSYS is integrated with startup operation strategy programmed in MATLAB to implement startup. An evolutionary algorithm is used to optimize startup strategy with the result of reducing energy by 25%.

万方数据

Hybrid Spider Monkey Optimization Algorithm and Its Application in Optimiation of Acetylene Hydrogenation Parameters

YE Zhencheng, RAO Debao, CHENG Hui

Journal of East China University of Science and Technology, 2019, 45(2): 241-249.



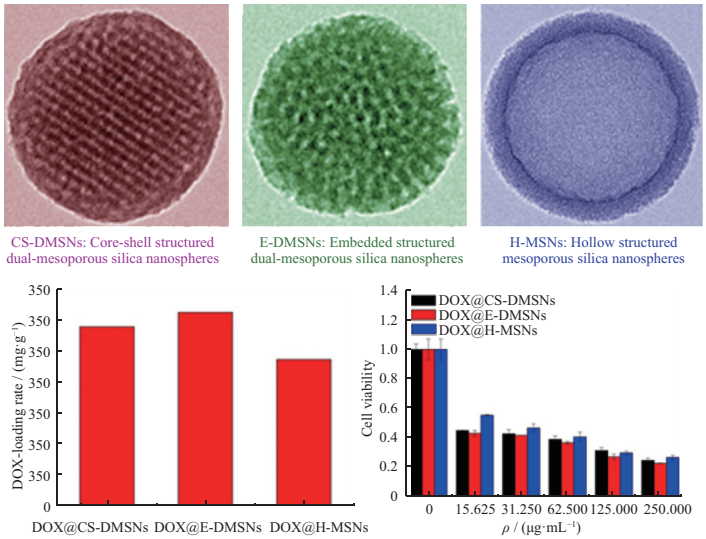
Based on the spider monkey algorithm (SMO), this paper proposes the always-mixed spider monkey algorithm (QSMO) to improve the performance of the algorithm. The hybrid algorithm and the comparison algorithm are applied to the parameter optimization of the acetylene hydrogenation model respectively. The optimization results of the comparison algorithm show that the hybrid algorithm is more suitable for solving engineering application problems.

· Materials Science and Engineering ·

Drug Delivery Performances of Silica Nanoparticles with Tunable Morphologies and Pore Structures

JIANG Yu, NIU Dechao, LI Yongsheng

Journal of East China University of Science and Technology, 2019, 45(2): 250-257.



A simple and controlled synthetic method is reported to prepare three kinds of hierarchical porous silica nanoparticles with different morphologies and pore structures, including core-shell structured dual-mesoporous silica nanospheres (CS-DMSNs), embedded dual-mesoporous silica nanospheres (E-DMSNs) and hollow mesoporous silica nanospheres (H-MSNs). The drug delivery capability of these silica-based porous nanoparticles was investigated.

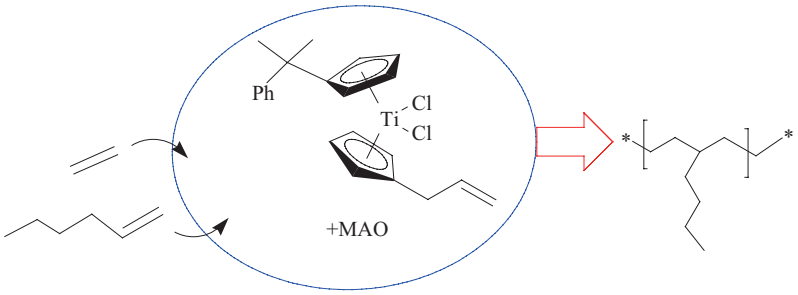
万方数据

Synthesis of Bifunctional Metallocene and Their Application for Ethylene Copolymerization with 1-Hexene

LYU Zhongwen, CUI Zhang, XU Sheng

Journal of East China University of Science and Technology, 2019, 45(2): 258-265.

Metallocene complexes with bifuncational allyl and aryl group on cyclopentadienyl ligands(Cp) were synthesized and characterized. When combined with MAO, these complexes indicated moderate catalytic activity for ethylene polymerization and ethylene copolymerization with 1-hexene.

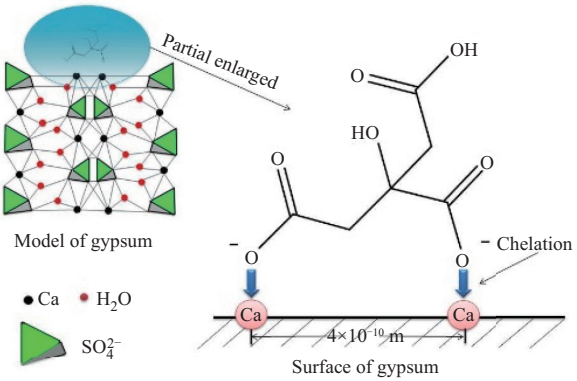


Adsorption Characteristics of Additives on Hemihydrate Calcium Sulfate

FU Wenjian, LIN Meiqing, HE Huiyan, CHEN Jie, CHENG Yun, ZHAO Min

Journal of East China University of Science and Technology, 2019, 45(2): 266-274.

Using various analytical tests, the adsorption mechanism of additives on the surface of hemihydrate calcium sulfate (HCS) was studied. Taking citric acid as an example, adsorption on the surface of HCS was briefly described.

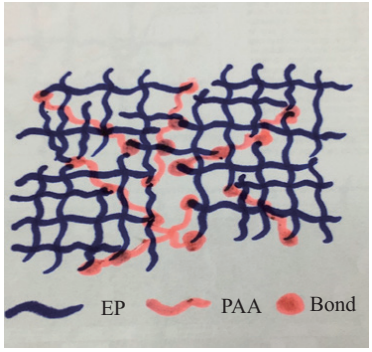


Epoxy Resin Modified with Highly Soluble Polyamide Acid Oligomer

QIE Feng, CHEN Qi, WANG Xingyi

Journal of East China University of Science and Technology, 2019, 45(2): 275-284.

The DDS cured E51 is modified by a highly soluble polyamide acid oligomer (PAA-*n*). There is a good compatibility between PAA-*n* and E51. Thus, the impact strength of composites is improved greatly by PAA-*n* with the increase of 72.2%, while the other mechanic and thermal mechanic properties maintain constant.



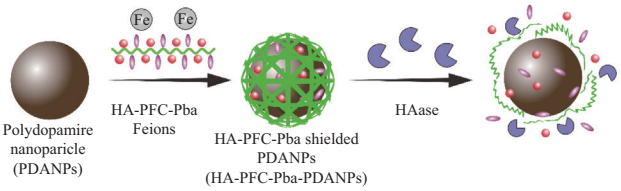
万方数据

Polydopamine-Loaded Fluorinated Hyaluronic Acid (HA) Photosensitizer Nanoparticles for Synergetic Photodynamic and Photothermal Therapy of Hypoxic Tumors

TIAN Jun, ZHANG Weian

Journal of East China University of Science and Technology, 2019, 45(2): 285-292.

To overcome the hypoxia of tumor, we created a novel fluorinated PDT-PTT system. The HA-PFC-Pba-PDANPs was synthesized by metal complexation of PDANPs and HA. Due to the excellent photothermal conversion ability of PDANPs, higher oxygen affinity of perfluorocarbon segments and the tumor targeting nature of HA, this nanoparticle provided preferable therapeutic efficacy against cancer cells.



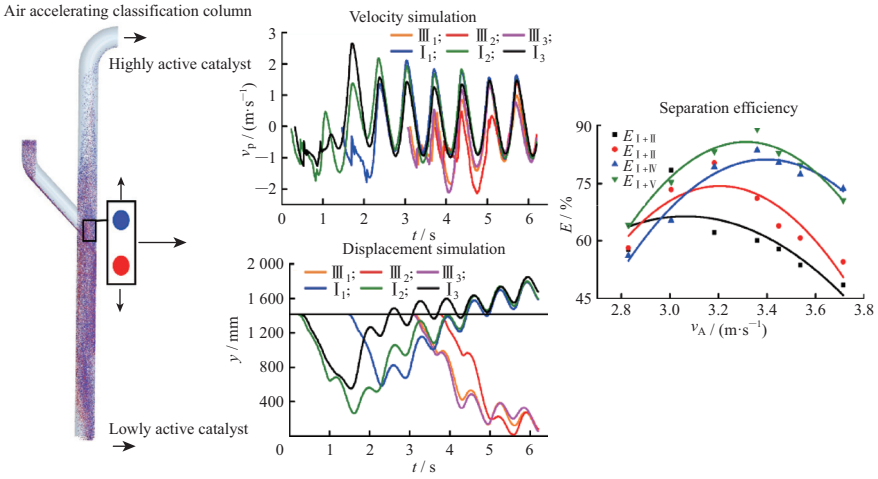
· Environmental Engineering ·

CFD-EDM Simulation of Discharged Catalyst By Acceleration Air Classification

FANG Yilin, FU Pengbo, WANG Hualin

Journal of East China University of Science and Technology, 2019, 45(2): 293-300.

The coupled CFD-EDM simulations of catalysts classification were studied through air acceleration classification according to their activities. The simulations were validated by experiments. The present study could also serve as a useful guide in the industrial catalyst separation. This paper created more favorable conditions for separation of various fine particle.

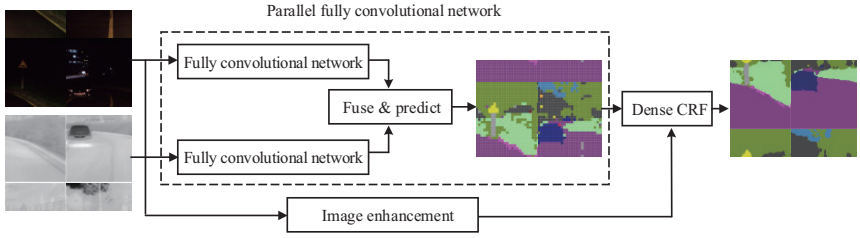


· Information Science and Engineering ·

Night Road Scene Semantic Segmentation Based on Visible and Infrared Thermal Images

WU Junyi, GU Xiaojing, GU Xingsheng

Journal of East China University of Science and Technology, 2019, 45(2): 301-309.



A method for night road scene semantic segmentation by effectively combining visible and infrared thermal image information is proposed. The results of semantic segmentation are predicted by parallel full convolutional neural network structure, and furtherly optimized by dense conditional random field with enhanced dual-band images' information.

万方数据

Real Time Low Visibility Auxiliary Driving System Based on Dark Channel Prior

JIN Yue, WANG Nan, YE Jiongyao

Journal of East China University of Science and Technology, 2019, 45(2): 310-315.

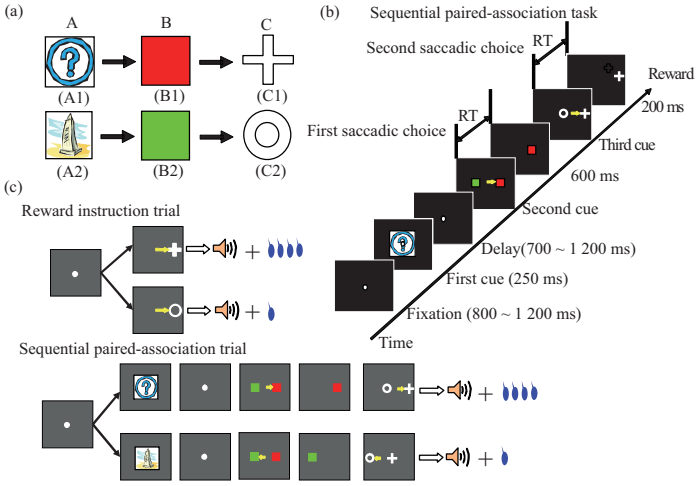
The algorithm uses the dark channel prior knowledge to obtain the atmospheric transmission map of the highway fog image. Then, the measurement line of the visibility measurement system is obtained by the gradient variation of atmospheric transmission values within the measurement band. Finally, the detection of visibility distance is accomplished by combining the principle of single camera calibration and visibility detection.

Quantitative Analysis of Functional Connectivity between Prefrontal Cortex and Striatum

WEN Zaizhi , ZHANG Jianhua, PAN Xiaochuan

Journal of East China University of Science and Technology, 2019, 45(2): 316-327.

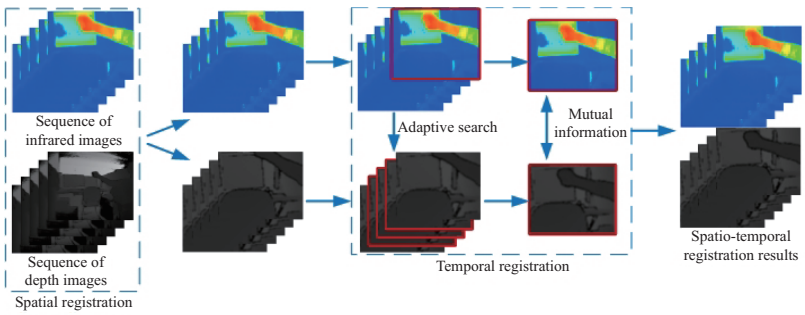
The local field potentials (LFP) are experimentally recorded in the lateral PFC and striatum of two male monkeys while the monkeys are performing the sequential paired-association task with the asymmetric reward scheme. The nonlinear interdependence (NLI) measure is used to quantify the strength of functional connectivity between the PFC and striatum.



Spatio-Temporal Registration of Infrared and Depth Cameras Based on Adaptive Mutual Information

HAN Song, GU Xiaojing, GU Xingsheng

Journal of East China University of Science and Technology, 2019, 45(2): 328-335.



A spatio-temporal registration method for infrared camera and depth camera based on adaptive mutual information is proposed. After spatial registration, the candidate depth images are selected by changing the size of the search window adaptively. The mutual information between the infrared image and the depth image is calculated. And then the sequence of infrared images and the depth images realize the spatio-temporal registration.

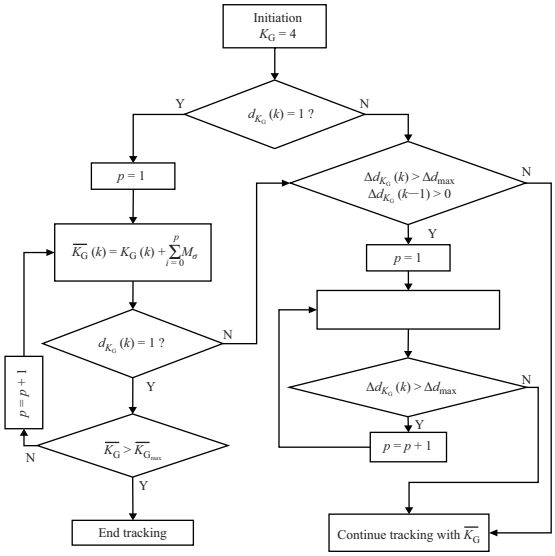
万方数据

Association Gate Algorithm for Multi-target Tracking Based on Association Performance Evaluation

ZHANG Cheng, ZHAO Han, LIN Jiajun

Journal of East China University of Science and Technology, 2019, 45(2): 336-343.

A novel method to design adaptive association gate is proposed to solve the problem that the traditional association gate is easy to cause wrong target tracking and accuracy decline when it is applied to multi-target tracking. Association evaluation and its error rate between current state estimation and measurement values can be obtained through building an association performance criterion function, which can be used as sensitivity index to preset association gate before tracking loss or deviation of target association. So that we can not only guarantee validated measurements existing in the gate but also reduce the interference from clutters and measurements belonging to other targets.

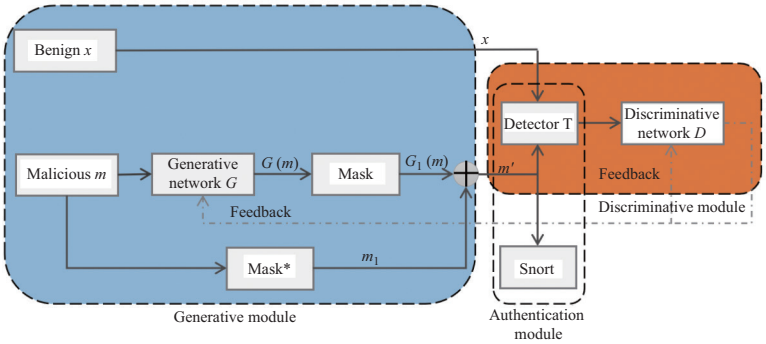


Generation and Verification of Malicious Network Flow Based on Generative Adversarial Networks

PAN Yiming, LIN Jiajun

Journal of East China University of Science and Technology, 2019, 45(2): 344-350.

A generative adversarial nets(GAN) based model is proposed to generate malicious network flow adversarial examples. Weakly related bits constraint guarantees adversarial examples' executability and offensiveness. For the first time, a malicious network flow is used as the original example to generate an adversarial example.

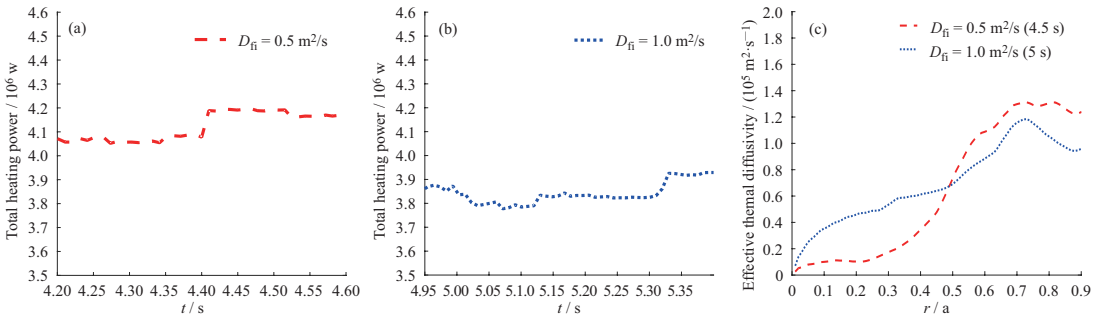


· Physics ·

Effects of Anomalous Fast Ion Diffusion on Heat transport in EAST

ZHAO Yuan, ZHANG Xianmei, YU Limin, XUE Erbing, CHEN Weidong

Journal of East China University of Science and Technology, 2019, 45(2): 351-356.



The fast ion transport is anomalous when the minimum safety factor (q_{min}) is about 2 in EAST with NBI. NBI heating efficiency, plasma stored energy and the total heating power are decreased when the fast ion transport is anomalous. The plasma effective thermal transport coefficient is larger when the fast-ion diffusion coefficient is bigger.

万方数据