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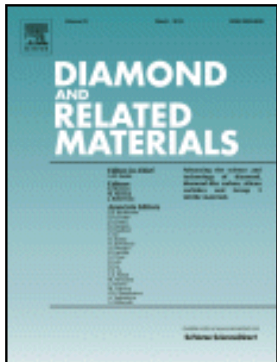
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2 [A strategy for increased carbon ionization in magnetron sputtering discharges](#) Original Research Article
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Asim Aljazz, Kostas Sarakinos, Daniel Lundin, Nils Brenning, Ulf Helmersson
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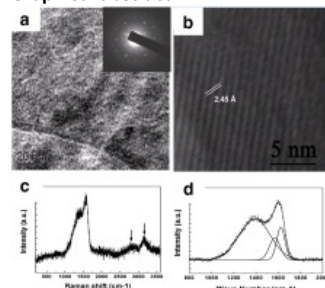
Highlights

► We achieve increased carbon ionization in high power impulse magnetron sputtering discharge. ► Increase in carbon ionization is achieved via the increase in electron temperature. ► The electron temperature is increased by utilizing a higher ionization energy sputtering gas (Ne) instead of conventionally used Ar. ► The Ne-HiPIMS discharge is characterized by energetic C⁺ ion population with three-fold increase in total number of C⁺ ions. ► The increased carbon ionization enables to synthesize carbon films with densities upto 2.8 g/cm³.

3 [Ultra-elastic recovery and low friction of amorphous carbon films produced by a dispersion of multilayer graphene](#) Original Research Article
Pages 5-9
Junyan Zhang, Bin Zhang, Qunji Xue, Zhou Wang
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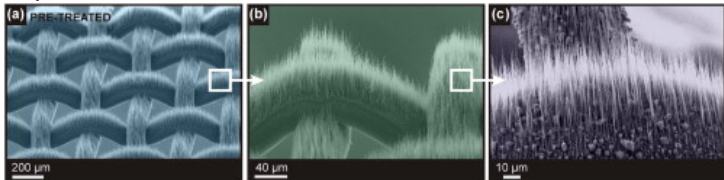
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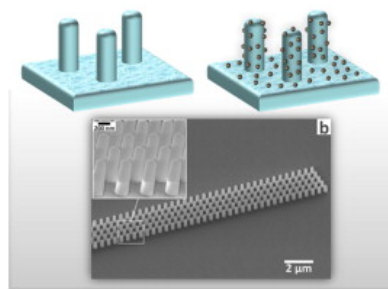


Highlights

► Target poisoning methods can be employed to grow carbon nanostructured films. ► Multilayer graphene will enhance the mechanical properties of amorphous carbon films. ► Multilayer graphene can improve the tribology properties.

4		Metal–semiconductor ohmic contacts: An ab initio Density Functional Theory study of the structural and electronic properties of metal–diamond (111)-(1 × 1) interfaces Original Research Article <i>Pages 10-17</i> I. Motochil, N.W. Makau, G.O. Amolo Related articles Related reference work articles	Purchase
Highlights ► Hydrogen stabilized the clean diamond surface. ► Ti, V and Ta formed strong bonds while Au and Pd formed weak bonds. ► Band gap removal shows that metallization induces conduction on the surfaces. ► Ab initio calculations show that Ti, V and Ta are good for ohmic contact formation.			
5		Graphene modification with gold nanoparticles using the gas aggregation technique Original Research Article <i>Pages 18-22</i> L.E.G. Armas, G.T. Landi, M.F.G. Huila, A. Champi, M. Pojar, A.C. Seabra, A.D. Santos, K. Araki, H.E. Toma Related articles Related reference work articles	Purchase
6		Charge carrier mobility in gallium nitride Original Research Article <i>Pages 23-27</i> Orest Malyk Related articles Related reference work articles	Purchase
Highlights ► The charge carrier scattering processes in wurtzite GaN are considered. ► The temperature dependence of the charge carriers mobility is calculated. ► The temperature dependence of the charge carriers Hall factor is calculated.			
7		A narrow biasing window for high density diamond nucleation on Ir/YSZ/Si(100) using microwave plasma chemical vapor deposition Original Research Article <i>Pages 28-33</i> Murari Regmi, Karren More, Gyula Eres Related articles Related reference work articles	Purchase
Highlights ► A new design for the biasing stage using no bias ring. ► High nucleation density with this new stage configuration. ► Narrow processing window in bias voltage and methane concentration. ► Implications of the narrow processing windows for nucleation and growth mechanisms of diamond.			
8		Reactive biased target ion beam deposited W–DLC nanocomposite thin films — Microstructure and its mechanical properties Original Research Article <i>Pages 34-43</i> P. Vijai Bharathy, Q. Yang, M.S.R.N. Kiran, JongJoo Rha, D. Nataraj, D. Mangalaraj Related articles Related reference work articles	Purchase
Highlights ► W–DLC films deposited by a new Reactive Biased Target Ion Beam Sputtering. ► The effect of low W fraction on the properties of DLC film was investigated. ► The microstructure and mechanical properties are depending on W fraction. ► W–DLC films show very low friction coefficient and improved adhesion strength. ► RBTID is a promising technique to synthesize high quality protective coatings.			
9		Structural and mechanical properties of low-density amorphous carbon nitrides by molecular dynamics simulations Original Research Article <i>Pages 44-49</i> Xue Jiang, Chunqiang Zhuang, Jijun Zhao, Xin Jiang Related articles Related reference work articles	Purchase
Highlights ► We generated four with different stoichiometries a-CN _x using MD method. ► The competition between sp ² –sp ³ of a-CN _x is interpreted by the electronic effect. ► No superhard stoichiometry a-CN _x was found. ► The hardness of the a-CN _x was determined by the fraction of sp ³ C–C bond.			
10		Computer simulations of nanostructured carbon under tensile load: Electronic structure and optical gap Original Research Article <i>Pages 50-53</i> Christos Mathioudakis, Maria Fyta Related articles Related reference work articles	Purchase
Highlights ► We model amorphous carbon and diamond composite networks using a tight-binding molecular dynamics scheme. ► Tensile strain is applied on both networks up to their fracture point. ► The electronic structure, Urbach energy and optical gaps of the strained networks are extracted from the simulations. ► The variation of the optical gaps and Urbach energy with the hybridization content is discussed.			
11		Effect of Fe load on the synthesis of C nanotubes by isobutane decomposition over Na-exchanged montmorillonite-clay catalysts Original Research Article <i>Pages 54-60</i>	Purchase

	S. Santangelo, G. Messina, E. Piperopoulos, M. Lanza, G. Faggio, C. Milone Related articles Related reference work articles Highlights ► MWCNT growth by 700 °C CVD over Fe-catalysts supported on Na⁺-K10 clay is considered. ► The influence of iron-addition (5–25 wt.%) on the catalyst performances is studied. ► Results are compared with those previously obtained over Fe/Al₂O₃ catalysts at 600 °C. ► In both the cases the highest yield is reached upon the same relative to Fe C-supply. ► MWCNTs grown over 15 wt.%Fe/Na⁺-K10 catalysts exhibit outstanding crystalline quality.	
12	 Frictional behavior on wrinkle patterns of diamond-like carbon films on soft polymer Original Research Article Pages 61-65 Seong Jin Kim, Ju-Il Yoon, Myoung-Woon Moon, Kwang-Ryeol Lee Related articles Related reference work articles Highlights ► Wrinkling was tuned by tuning the deposition thickness of hard film on polymer. ► Friction was tuned due to wrinkle roughness by tuning deposition thickness. ► Flattening of wrinkle which increases contact area occurred during wear. ► Decrease in friction protects wrinkled surface from the surface wear.	Purchase
13	 In-situ deposition of sparse vertically aligned carbon nanofibres on catalytically activated stainless steel mesh for field emission applications Original Research Article Pages 66-71 M.T. Cole, K. Hou, J.H. Warner, J.S. Barnard, K. Ying, Y. Zhang, C. Li, K.B.K. Teo, W.I. Milne Related articles Related reference work articles Graphical abstract 	Purchase
14	 An Aluminum Nitride-based chemical sensor using Q-DLTS Original Research Article Pages 72-75 J.B. Rothenberger, D.E. Montenegro, M.A. Prelas, T.K. Ghosh, R.V. Tompson, S.K. Loyalka Related articles Related reference work articles Highlights ► The AlN surface was exposed to vapors and Q-DLTS measurements were made. ► Observed Q-DLTS spectra changed with vapor exposure and over time. ► After vapor exposure, spectra were observed to return to pre-exposure levels. ► Q-DLTS outputs for each vapor were compared to observe differences.	Purchase
15	 A mechanistic study on the growth of multi-walled carbon nanotubes by methane decomposition over nickel–alumina catalyst Original Research Article Pages 76-82 Inusa Abdullahi, Nataphan Sakulchaicharoen, Jose Efrain Herrera Related articles Related reference work articles Highlights ► MWCNT growth was conducted in a riser simulator by methane decomposition. ► First order decomposition of methane during MWCNT growth. ► Deactivation of the Ni–Al₂O₃ catalyst was minimal during carbon nanotube growth. ► Activation energy for methane decomposition on the catalyst was 37.1 ± 3.5 kJ/mol.	Purchase
16	 Electrostatic grafting of diamond nanoparticles towards 3D diamond nanostructures Original Research Article Pages 83-87 H.A. Girard, E. Scorsone, S. Saada, C. Gesset, J.C. Arnault, S. Perruchas, L. Rousseau, S. David, V. Pichot, D. Spitzer, P. Bergonzo Related articles Related reference work articles Graphical abstract	Purchase



Highlights

► Nanoseeding is homogeneously performed on silicon nanostructures below 1 μm. ► Silicon nanotips of $1.5 \times 0.8 \mu\text{m}^2$ are perfectly covered with a regular thin polycrystalline diamond layer. ► Diamond nanopillars of $200 \times 800 \text{ nm}^2$ are realized with a very high reproducibility by a bottom-up approach.

17 ☐

Phonon localization around vacancies in graphene nanoribbons

Original Research Article

Pages 88-92

G.C. Loh, E.H.T. Teo, B.K. Tay

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Highlights

► It is shown that localization mainly affects long-wavelength and high-frequency modes. ► Spatial analyses suggest that localized acoustic modes are concentrated around the vacancy and at edges. ► Optical modes encounter stronger inelastic scattering than acoustic modes. ► Some of the acoustic modes exhibit a gradual spatial evolution of localization strength.

18 ☐

Analytical TEM study of CVD diamond growth on TiO₂ sol-gel layers

Original Research Article

Pages 93-99

Ying-Gang Lu, Johan Verbeeck, Stuart Turner, An Hardy, Stoffel D. Janssens, Christopher De Dobbelaere, Patrick Wagner, Marlies K. Van Bael, Ken Haenen, Gustaaf Van Tendeloo

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Highlights

► Early growth stages of CVD diamond growth on TiO₂/UDD buffer layers are investigated. ► Carbon diffusion and diamond seed stability are studied by analytical TEM. ► HRTEM and EELS demonstrate TiC is formed during growth. ► A model explaining the influence of the sol-gel TiO₂ layer on the diamond growth is presented.

19 ☐

Spatially controlling neuronal adhesion on CVD diamond

Original Research Article

Pages 100-104

P.W. May, E.M. Regan, A. Taylor, J. Uney, A.D. Dick, J. McGeehan

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Highlights

► Growth of neurons on different types of diamond surfaces are compared. ► Oxidised diamond surfaces are excellent for growth of neurons. ► Laser patterning is a novel method to pattern diamond surfaces to control the adhesion of neurons. ► Neurons grow along laser etched pathways in diamond.

20 ☐

C₂₀-related structures: Diamond D₅

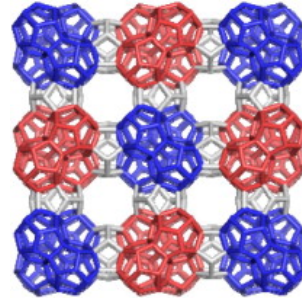
Original Research Article

Pages 105-108

Mircea V. Diudea, Csaba L. Nagy

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Highlights

► Model study of five-membered ring carbon multi-cage. ► Synthetic route to an all pentagonal carbon network, diamond D_5 . ► Aromaticity of C_{57} and reduced multi-cage species.

21 ☐ 

Local stress distribution of dislocations in homoepitaxial chemical vapor deposit single-crystal diamond Original Research Article
Pages 109-111

Yukako Kato, Hitoshi Umezawa, Shin-ichi Shikata, Tokuyuki Teraji

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Highlights

► Analyzed dislocations are in homoepitaxial chemical vapor deposit single-crystal diamond. ► The local stresses around the dislocation are between -93 to $+40$ MPa. ► The 45 degree mixed dislocation model is suggested. ► The possibility of aggregation of dislocations is also suggested, too.

22 ☐ 

The valuable role of renucleation rate in ultrananocrystalline diamond growth Original Research Article
Pages 112-119

D.C. Barbosa, P. Hammer, V.J. Trava-Airoldi, E.J. Corat

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Highlights

► The renucleation rate in ultrananocrystalline diamond growth ambient promotes a decrease of film specific mass. ► The renucleation rate in ultrananocrystalline diamond growth ambient promotes an increase of sp^2 content. ► The renucleation rate in UNCD growth decreases film specific mass, increases sp^2 content, increases C-H correlated with C-C chemical bonding and shows a quadratic correlation with $[CH_4]/[H_2]$ in feed gas.

23 ☐ 

Fabrication and implementation of nanodiamond lateral field emission diode for logic OR function Original Research Article
Pages 120-124

N. Ghosh, W.P. Kang, J.L. Davidson

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Highlights

► We report fabrication and characterization of vacuum OR gate logic. ► Four sets of diodes with different number of equally spaced emitters were studied. ► Nanodiamond emitters were characterized for emission current scaling. ► Two identical diodes were connected in a diode-resistor logic circuit. ► The current scaling behavior directly effects the logic OR response.

24 ☐ 

Infrared microspectroscopy of natural Argyle pink diamond Original Research Article
Pages 125-129

K.S. Byrne, J.D. Anstie, J. Chapman, A.N. Luiten

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Highlights

► Spatial correlation between IR absorption and pink colouration in Argyle diamond. ► Spatial distribution of "B-centre" seen to be anti-correlated with pink colour. ► Defects in pink graining possibly due to destruction of B-centres. ► No change seen in IR absorption bands (including B-centre) due to photochromism. ► Suggests "pink colour centre" shows no IR absorption.

25 ☐ 

Carbon nanostructures: A morphological classification for charge density optimization Original Research Article
Pages 130-134

Brian R. Stoner, Jeffrey T. Glass

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Highlights

► Linear edge density (ρ_L) was approximated for each carbon nano-structure. ► Electron Density of Graphene Edges (EDGE) Triangle maps different nano-structures. ► The EDGE Triangle is organized based

on dimensional structure of sp^2 bonded edges.	
26	Electrical properties of textured carbon film formed by pulsed laser annealing Original Research Article <i>Pages 135-139</i> Naiyun Xu, Hang Tong Edwin Teo, Maziar Shakerzadeh, Xincai Wang, Chee Mang Ng, Beng Kang Tay Related articles Related reference work articles Purchase
Highlights ► We fabricate textured carbon (a-C) film using KrF excimer laser annealing method. ► We study its microstructure using visible Raman and transmission electron microscopy. ► Suitable laser energy density will induce the texture structure in a-C film. ► The presence of texture structure will increase the electrical conductivity of the film.	
27	Investigation of nano structures on ta-C films made by gallium FIB lithography Original Research Article <i>Pages 140-143</i> P. Philipp, L. Bischoff Related articles Related reference work articles Purchase
Highlights ► A novel design of an organic diamond disk (ODD) is proposed. ► The ODD improves the leveling of the diamond tips. ► ODDs yield a higher polishing rate and better surface quality. ► ODDs are feasible diamond disk for improving polishing and dressing efficiency.	
28	Organic diamond disk versus brazed diamond disk for dressing a chemical-mechanical polishing pad Original Research Article <i>Pages 144-149</i> M.Y. Tsai, P.H. Li, J.C. Sung Related articles Related reference work articles Purchase
Highlights ► First NMR study of nanodiamonds fabricated by laser treatment of carbon soot. ► First EPR study of nanodiamonds fabricated by laser treatment of carbon soot. ► Size dependence of EPR spectra and ^{13}C spin-lattice relaxation time.	
29	Magnetic resonance study of nanodiamonds prepared by laser-assisted technique Original Research Article <i>Pages 150-153</i> A.M. Panich, A.I. Shames, B. Zousman, O. Levinson Related articles Related reference work articles Purchase
Highlights ► Photochromic behaviours were observed in electron-irradiated either low N or B-doped diamond. ► These modifications are stable over periods of several years at room temperature. ► The enhancement of a centre in B-doped diamond can be eliminated by annealing at 200 C. ► And then subsequently refreshed by UV exposure at low temperature.	
30	Erasable optical data storage in diamond with room temperature read-out and other photochromic and thermochromic properties of diamond Original Research Article <i>Pages 154-156</i> John Steeds, Wang Kaiyue, Li Zhihong Related articles Related reference work articles Purchase
Highlights ► First review of nuclear spin-lattice relaxation in carbon nanomaterials. ► Data analysis for static and MAS regimes. ► Data analysis for different contributions to relaxation. ► First nuclear spin-lattice relaxation data in graphene and carbon nanoscrolls.	
31	Nuclear spin-lattice relaxation and paramagnetic defects in carbon nanomaterials Original Research Article <i>Pages 157-161</i> A.M. Panich, G.B. Furman Related articles Related reference work articles Purchase
Highlights ► The 523.7 nm centre is very common in electron-irradiated high N diamonds. ► There are remarkable differences between absorption and emission results. ► No clear evidence about the natural structure was found for this centre.	
32	Photoluminescence studies of the 523.7 nm optical centre in HPHT synthetic diamond Original Research Article <i>Pages 162-166</i> Kaiyue Wang, John Steeds, Zhihong Li Related articles Related reference work articles Purchase

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Mechanical and electrical properties of carbon nanotubes and graphene layers functionalized with amines Original Research Article
Pages 167-171
Karolina Milowska, Magdalena Birowska, Jacek A. Majewski
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Highlights

► We calculate mechanical and electrical properties of graphene and carbon nanotubes functionalized with amine molecules. ► Amine molecules NH and NH₂ build strong covalent bond to graphene and carbon nanotubes. ► Young's modulus of functionalized systems is smaller than of pure ones. ► Functionalization of graphene layer with NH and NH₂ opens fundamental band gap.
- 34

Fracture strength of optical quality and black polycrystalline CVD diamonds Original Research Article
Pages 172-177
V.G. Ralchenko, E. Pleuler, F.X. Lu, D.N. Sovyk, A.P. Bolshakov, S.B. Guo, W.Z. Tang, I.V. Gontar, A.A. Khomich, E.V. Zavedeev, V.I. Konov
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Highlights

► The bending strength of polycrystalline diamond films of two grades, of optical quality with thickness in the broad range of 0.06–1.0 mm, and opaque ones, both grown by microwave plasma CVD, has been measured a three-point method. The virgin and fractured free-standing films were characterized with microRaman spectroscopy, SEM, and optical profilography. ► While the strength of transparent material turns out to be pretty high (up to 2200 MPa for the thinnest 60 µm samples), the < 100 > fiber texture black diamond films, due to weak defected grain boundaries, show intergranular fracture and two times lower strength compared to the "white" diamond of comparable thickness. ► This result underlines the impact of grain boundary structure on mechanical properties of polycrystalline diamond.
- 35

Low-strain interface models for epitaxial graphene on SiC(0001) Original Research Article
Pages 178-183
Gabriele Sclauzero, Alfredo Pasquarello
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Highlights

► We illustrate a simple way to build graphene/SiC(0001) model interface structures. ► Interesting structures with low graphene strains are identified visually. ► These structures differ by SiC periodicity and graphene/SiC relative rotation angle. ► We analyze the interface binding energetics in terms of Si-dangling bond saturation. ► This simple model does not account for the different stability of these interfaces.
- 36

Effect of deposition parameters on wear particle size distribution of DLC coatings Original Research Article
Pages 184-188
Ying Ren, Ingo Erdmann, Berrin Küzün, Friederike Deuerler, Volker Buck
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Highlights

► 100 N as a load used in disc-on-disc testing to generate wear particles. ► The lowest friction coefficient of 0.035 attained at the bias of ~ 750 V. ► All particle size distributed in a range of 0.3–10 µm. ► The wear particle size decreased with increasing bias from ~ 250 V to ~ 1000 V. ► Wear particle size modified by varying the substrate bias.
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