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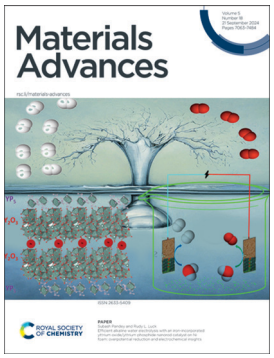
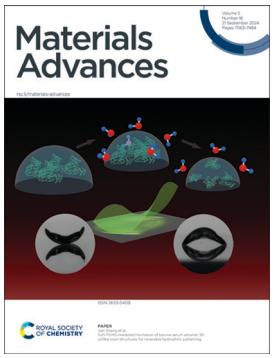
IN THIS ISSUE

ISSN 2633–5409 CODEN MAADC9 5(18) 7063–7484 (2024)



Cover
See Subash Pandey and Rudy L. Luck, pp. 7147–7158. Image reproduced by permission of Rudy L. Luck from *Mater. Adv.*, 2024, **5**, 7147. The background image was generated using AI at Gemini.google.com/app



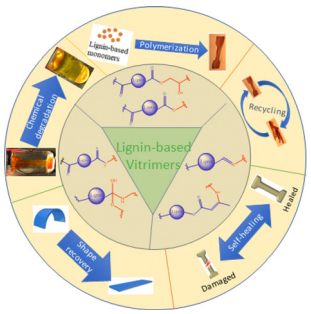
Inside cover
See Jian Sheng *et al.*, pp. 7159–7169. Image reproduced by permission of Kosuen Cheng, Kimberly Lopez, Maryam Jalali-Mousavi and Jian Sheng from *Mater. Adv.*, 2024, **5**, 7159.

REVIEWS

7075

Lignin-based vitrimers: valorization and utilization of lignin in high-value applications

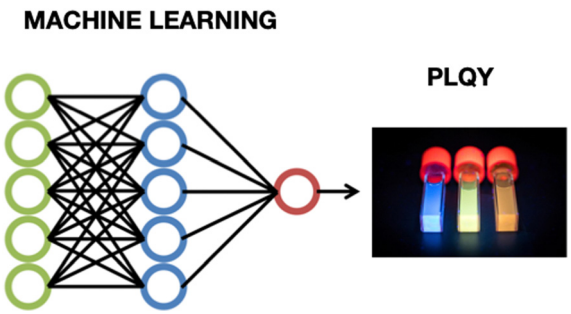
Peter K. Karoki, Shuyang Zhang, Yunqiao Pu and Arthur J. Ragauskas*



7097

Machine learning for carbon dot synthesis and applications

Ali Nabi Duman* and Almaz S. Jalilov*



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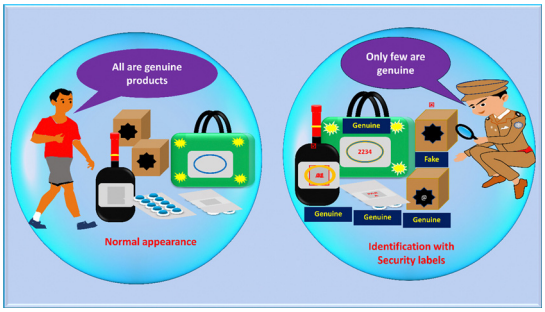
REVIEWS

7113

Optical anti-counterfeiting with cholesteric liquid crystal emulsions: preparation, properties, and applications

Buchaiah Gollapelli,* Supraja Potu, Rakeshkumar Rajaboina and Jayalakshmi Vallamkondu*



7130

The origin and evolution of molecular precursors for quantum dot synthesis

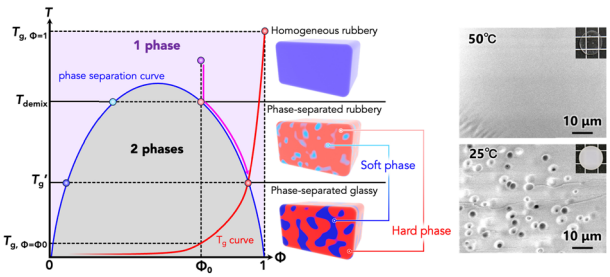
Mark Green

COMMUNICATION

7140

Phase separation-induced glass transition under critical miscible conditions

Mayu Watanabe, Dong Shi, Ryuji Kiyama, Kagari Maruyama, Yuichiro Nishizawa, Takayuki Uchihashi, Jian Ping Gong and Takayuki Nonoyama*

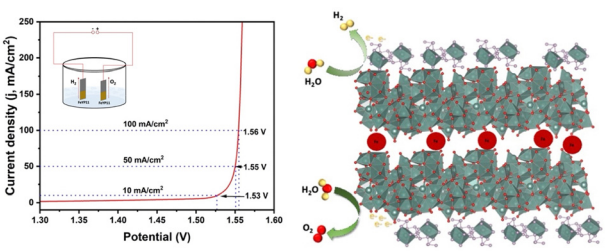


PAPERS

7147

Efficient alkaline water electrolysis with an iron-incorporated yttrium oxide/yttrium phosphide nanorod catalyst on Ni foam: overpotential reduction and electrochemical insights

Subash Pandey and Rudy L. Luck*



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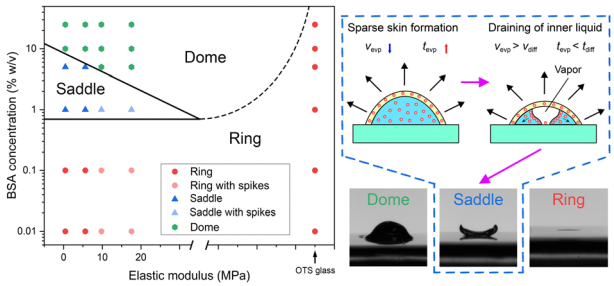
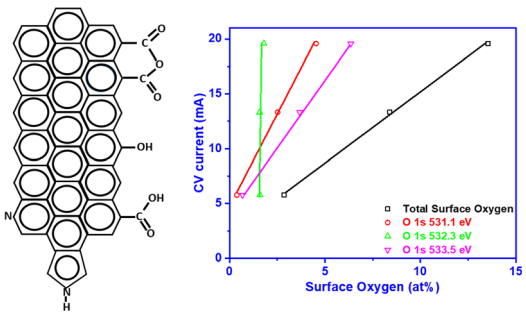
7159



Soft PDMS-mediated formation of bovine serum albumin 3D coffee stain structures for reversible hydrophilic patterning

Samuel Kok Suen Cheng, Kimberly Lopez, Maryam Jalali-Mousavi and Jian Sheng*

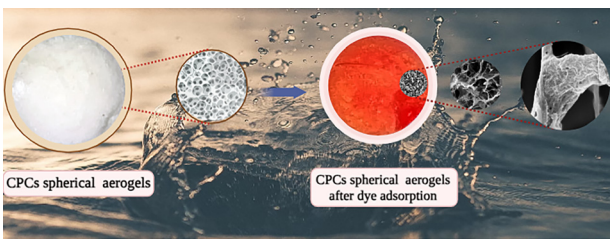
7170



Spectroelectrochemical study of carbon structural and functionality characteristics on vanadium redox reactions for flow batteries

Ha H. Phan, Jon G. Bell, Greg A. Mutch, Alan J. McCue, Anh N. Phan* and K. Mark Thomas*

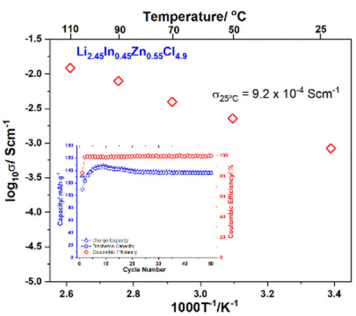
7199



Functional porous protein nanofibrils/polysaccharides aerogel beads for efficient dyes removal from water

Mandana Dilamian, Majid Montazer, Hossein Yousefi, Daniel E. Otzen and Dina Morshedi*

7222



Preparation of $Li_{2+x}In_xZn_{1-x}Cl_{4+2x}$ ($0 \leq x \leq 0.5$) solid electrolyte and its application in all-solid-state Li-ion batteries

Nguyen Thi Minh Nguyet, Tran Viet Toan, Luu Tuan Anh, Luong Thi Quynh Anh, Tran Anh Tu and Nguyen Huu Huy Phuc*

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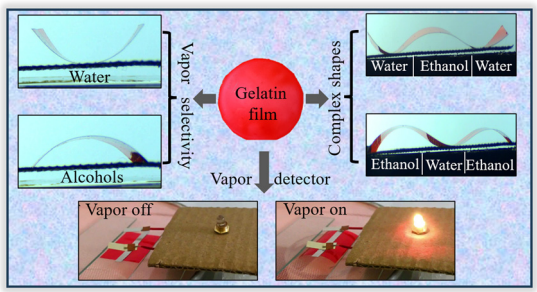
7230

Vapor selective and controlled actuation of gelatin-based soft actuators

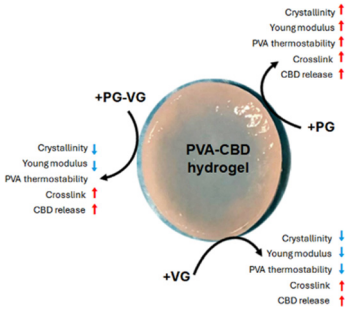
Vipin Kumar, Sarah Ahmad Siraj and Dillip K. Satapathy*



7244

Design, characterization, and release profile of a cannabidiol (CBD)-rich polyvinyl alcohol hydrogel

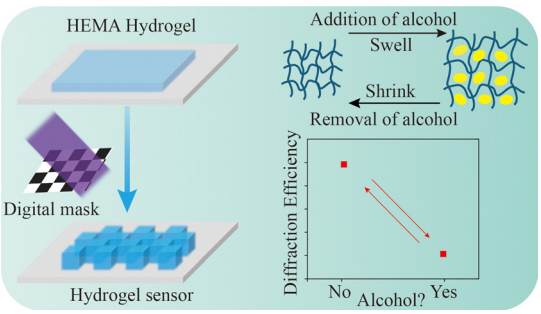
Shujun Cui, Maryam Bahraminia, Mahmoud Rouabhia,* Abdelhabib Semlali, François Béland and Ze Zhang



7256

DMD-based optical printing of PHEMA hydrogel gratings for sensitive and rapid alcohol sensing

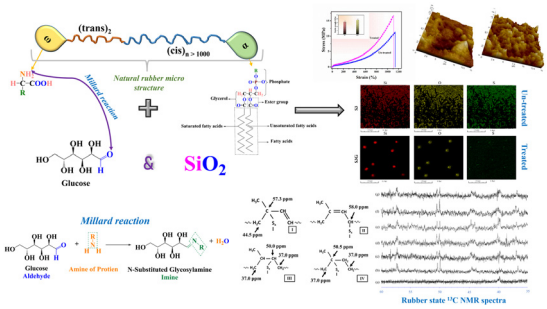
Jing Xu, Fanglei Guo, Carmen Bartic, Koen Clays and Yovan de Coene*



7264

A step towards a green and sustainable method to understand the effect of glucose on a silica filled natural rubber composite

Abhijit Bera, Masaki Yamano, Seiichi Kawahara* and Santanu Chattopadhyay*



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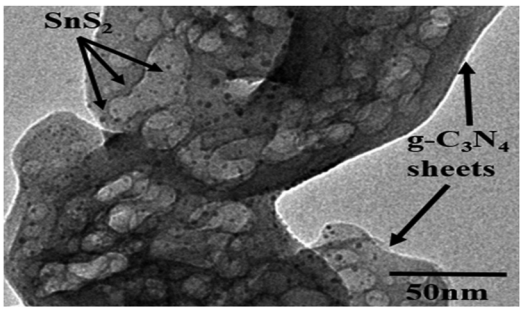
PAPERS

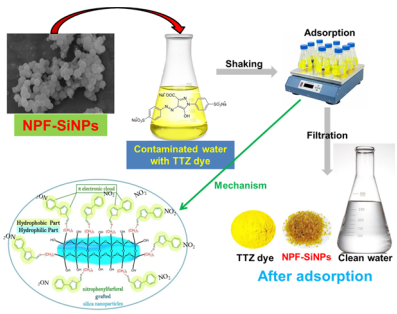
7278



Pioneering the design of S-scheme SnS_2/g-C_3N_4 nanocomposites *via* sonochemical and physical mixing methods for solar degradation of cationic rhodamine B dye

Ali Alsalme, Mustafa Hesham, Ayman Soltan, Nagy N. Mohammed, A. Qassim Nejm, M. F. Abdel Messih, Islam A. Hussein and M. A. Ahmed*

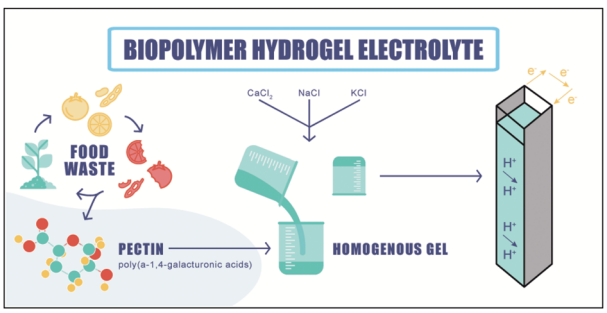
7296



Nitrophenylfurfural grafted amino functionalized silica nanoparticles for adsorptive removal of tartrazine dye from water

Syed Salman Shafqat,* Bushra Zafar, Syeda Amna Masood, Syed Rizwan Shafqat, Hafeez Ullah Khan, Asad Syed, Ali H. Bahkali, Sadaf Mutahir, Muhammad Asim Khan, Guobao Xu and Muhammad Nadeem Zafar*

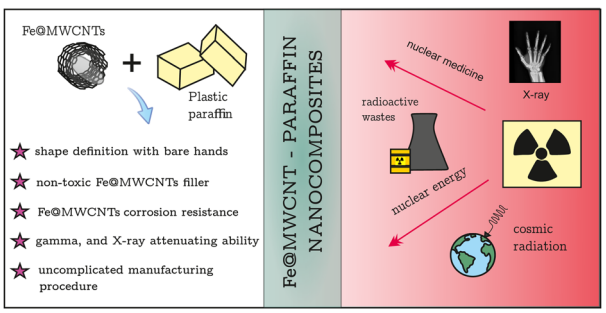
7312



Novel biopolymer pectin-based hydrogel electrolytes for sustainable energy storage

Nathan W. Wilson and Gerardine G. Botte*

7327



Soft, ternary, X- and gamma-ray shielding materials: paraffin-based iron-encapsulated carbon nanotube nanocomposites

Jolanta Sobczak, Adrian Truszkiewicz, Krzysztof Cwynar, Szymon Ruczka, Anna Kolanowska, Rafał G. Jędrysiak, Sylwia Waśkiewicz, Marzena Dzida, Sławomir Boncel* and Gaweł Żyła*

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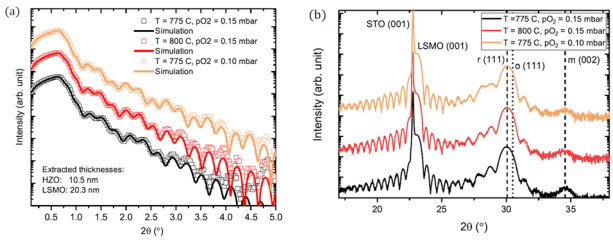
7342

Synthesis of rhombohedral $Hf_{0.5}Zr_{0.5}O_2$ and analysis by X-ray diffraction through dynamical diffraction simulations

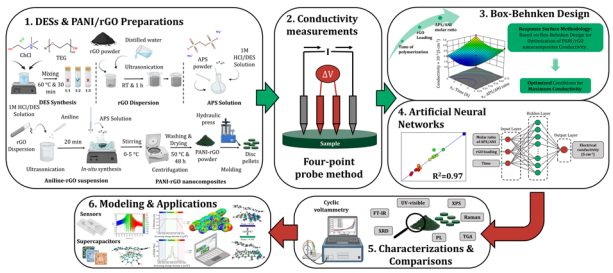
Kit de Hond, Guus Rijnders and Gertjan Koster*



7349

Comprehensive investigation of multifunctional polyaniline/reduced graphene oxide nanocomposites synthesized from deep eutectic solvents: experimental, RSM, ANN and computational studies

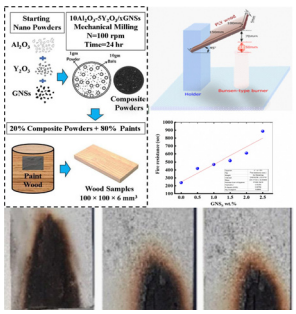
Abir Boublia, Zahir Guezzout, Nacerddine Haddaoui, Michael Badawi, Imane Lakikza, Ilyas Belkhettab, Ouahiba Moumeni, Saoussen Imene Aouni, Manawwer Alam and Yacine Benguerba*



7377

Low cost paints reinforced with an Al_2O_3/Y_2O_3/graphene nanocomposite for fire-resistant wood coating applications

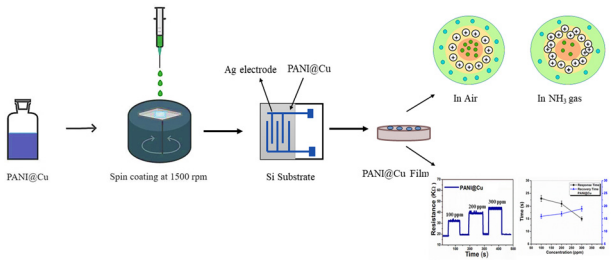
Ahmed El-Tantawy, Ibrahim M. Hassan, Omayma A. El-kady, Ahmed. I. Ali,* Jong Yeog Son* and Nasser. M. Ayoub



7387

Gas sensing properties of a Cu-doped PANI nanocomposite towards ammonia

Arunima Verma and Tanuj Kumar*



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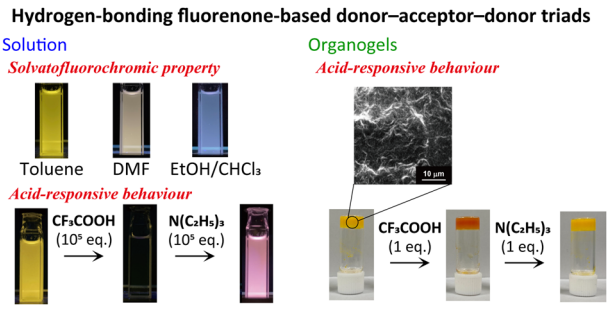
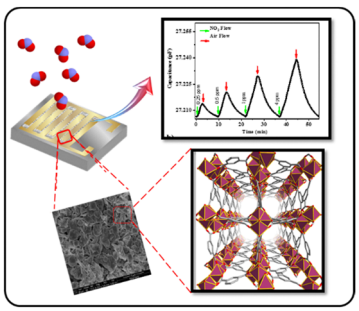
7401



Multi-stimuli-responsive behaviours of fluorenone-based donor–acceptor–donor triads in solution and supramolecular gel states

Mao Suzuki, Atsushi Seki,* Syota Yamada and Ken'ichi Aoki

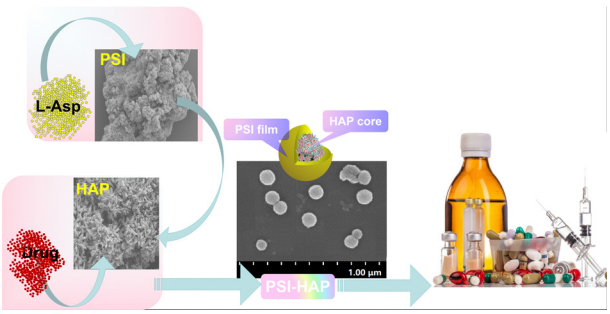
7413



The deployment of an NOTT-300 (Al) MOF thin film as a NO_2 capacitive sensor under ambient conditions

Mohamed Rachid Tchalala, Osama Shekhah, Youssef Belmabkhout, Hao Jiang, Khaled N. Salama* and Mohamed Eddaoudi*

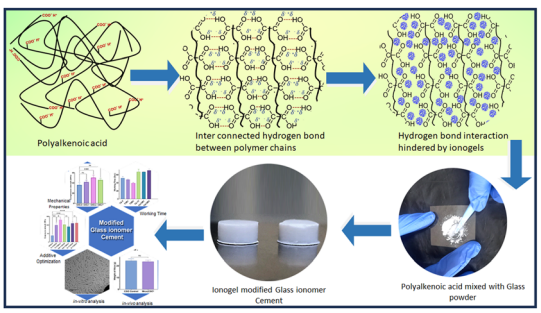
7419



Studies of a novel nano sustained-released drug delivery system with a hydroxyapatite core and polysuccinimide coating structure

Fengbo Yu, Qiang Wang, Dan Liu, Xingjun Fan, Lei Tong, Guangzhi Shen and Fengguo Zhai*

7432



Ionogel impregnated glass ionomer cement and the effect of nanoparticle additives

Sreejith Sasidharan Lathikumari and Manju Saraswathy*

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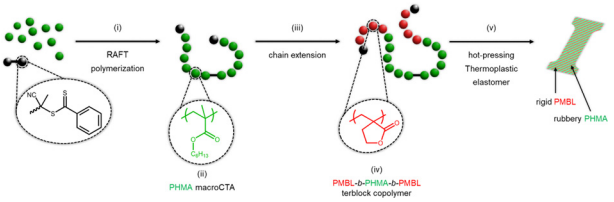
PAPERS

7446

Synthesis of a thermoplastic elastomer from α-methylene-γ-butyrolactone for high temperature applications

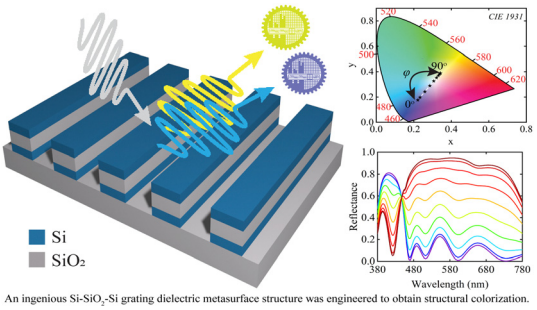
Friso G. Versteeg, Théophile Pelras, Giuseppe Portale and Francesco Picchioni*



7455

A polarization tunable incident angle tolerant dielectric metasurface-based color filter

Soikot Sarkar, Dip Sarker and Ahmed Zubair*

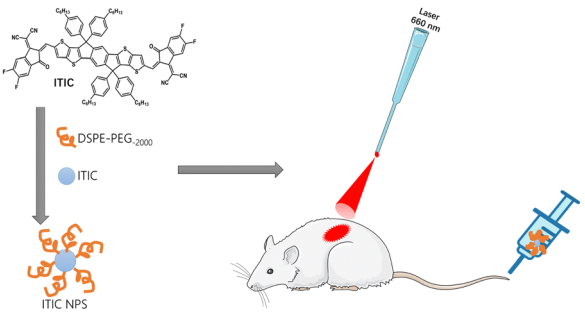


An ingenious Si-SiO_2-Si grating dielectric metasurface structure was engineered to obtain structural colorization.

7467

Synthesis of a new photosensitizer for laser-mediated photodynamic therapy to kill cancer cells in gliomas

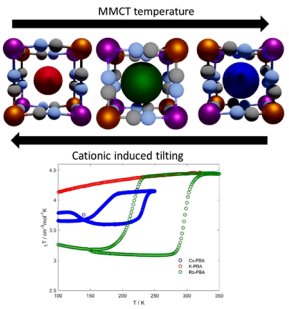
Guangshu Liang, Yining Yang, Daofu Cheng, Yuyan Ma and Linping Yan*



7473

Controlling $A_xMn[Fe(CN)_6]$ charge transfer pathways through tilt-engineering for enhanced metal-to-metal interactions

A. Regueiro, J. Castells-Gil, C. Shen, I. Mikulska, C. Allen, L. Bogani* and R. Torres-Cavanillas*



CORRECTION

7481

Correction: Imidazolium-based ionic liquids support biosimilar flavin electron transfer

Grace I. Anderson, Alec Agee and Ariel L. Furst*

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