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Endorsed by: SHS-AS – International Association on Self-Propagating High-Temperature Synthesis Member of the Institute of Topical Associations of the World Academy of Ceramics

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Endorsed by: LGM-AS – International Association for Layered and Graded Materials Member of the Institute of Topical Associations of the World Academy of Ceramics

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Ceramic Chemical Sensors: An Overview W. Weppner	1809
Semiconductor Gas Sensors for Environmental Monitoring M.C. Carotta, E. Ferrari, A. Giberti, C. Malagù, M. Nagliati, S. Gherardi, B. Vendemiati and G. Martinelli	1818
Gas Sensing Properties of TiO₂ and SnO₂ Nanopowders Obtained through Gel Combustion F.A. Deorsola, P. Mossino, I. Amato, B. DeBenedetti, A. Bonavita, G. Micali and G. Neri	1828
Sensor Sensitivity Study of the Thin and Thick WO₃ Films to Ozone A. Borisov, O. Ivanova, S. Krutovertsev and A. Pislyakov	1834

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Electrochemical Active Parts at Electrode/Electrolyte Interfaces for Solid Oxide Fuel Cells (SOFCs) by Isotope Labeling-SIMS Analysis T. Horita, H. Kishimoto, K. Yamaji, N. Sakai, Y.P. Xiong, M.E. Brito and H. Yokokawa	1857
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Microstructural Control of Composite Anode for Anode Supported Intermediate Temperature Solid Oxide Fuel Cells K. Sato, M. Uemura, A. Kondo, H. Abe, M. Naito and K. Nogi	1869
Single Chamber Solid Oxide Fuel Cell Using BaLaIn₂O_{5.5} Electrolyte M. Hibino, D. Michiba, K. Kanatani, H. Suzuki and T. Yao	1875
Fabrication of Components for Solid Oxide Fuel Cells by Tape Casting and Magnetic Pulsed Compaction A. Spirin, V. Ivanov, A. Lipilin, S. Paranin, V. Khrustov, A. Nikonov, A. Rempel and S. Ivin	1879

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Pseudocapacitive Manganese Oxide Prepared by a Spray Pyrolysis/Electrostatic Deposition Technique C.Y. Chen, C.K. Lin, Y.R. Lyu, H.H. Lin and W.H. Tuan	1896

Make Hydrogen while the Sun Shines: The Photoelectrolysis of Water Using Oxide Semiconductors

K. Rajeshwar, C.R.N. Chenthamarakshan, N.R. de Tacconi and S. Somasundaram

1902

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Zirconia Inert Matrix for Plutonium Utilisation and Minor Actinides Disposition in Thermal Reactors

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1907

Advanced Radiation-Resistant Ceramic Composites

Y. Katoh, L.L. Snead, T. Nozawa, N.B. Morley and W.E. Windes

1915

Thermodynamic Study of Al-Li-O-Zr: Experimental Results and Thermodynamic Assessment

I. Drouelle, S. Chatain, C. Guéneau, P. Zeller, D. Hamon and C. Toffolon-Masclet

1925

Thermochemical and Thermophysical Properties of Advanced Fission Fuel Materials

K. Minato, M. Takano, T. Nishi, M. Akabori, Y. Arai and M. Uno

1931

Mixed Lithium-Boron Materials

J.S. Joy

1941

Thermodynamic Modelling of the Uranium-Carbon-Oxygen System in the Frame of the Uranium Oxide and Carbon Interaction in the TRISO Fuel Particle of High Temperature Reactor

J.C. Dumas, J.P. Piron, S. Chatain and C. Guéneau

1944

J-3.2 Radiation Damage and Radiation Effects

Restructuring of Nuclear Oxide Fuel under High Burnup Irradiation

M. Kinoshita

1952

Radiation Damage Effects in Insulators for Fusion Reactors: Microstructure Evolution in MgO-Al₂O₃ System Oxide Crystals

K. Yasuda and S. Matsumura

1961

A First Principles Study of Palladium Impurities in Silicon Carbide

G. Roma

1969

Electrical Conductivity of Proton Conductive Ceramics under Reactor Irradiation

T. Shikama, B. Tsuchiya, S. Nagata and K. Toh

1974

Reducing Hydrogen Penetration through Corrosion Layer Formed on Zirconium Alloys by Iron Addition

K. Kakiuchi, K. Okubo, N. Itagaki, A. Miyazaki, Y. Ishii, S. Suzuki, T. Terai and M. Yamawaki

1980

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Processing Ceramics for Radioactive Waste Immobilisation

W.E. Lee, J. Juoi, M.I. Ojovan and O.K. Karlina

1986

Influence of Noble Metal Particles on Redox Reactions on Uranium Dioxide Surfaces

M.E. Broczkowski, J.S. Goldik, J.J. Noël and D. Shoesmith

1996

Single Phase Ceramic Wasteforms for Plutonium Disposition

N.C. Hyatt, M.C. Stennett, E.R. Maddrell and W.E. Lee

2004

Synthesis and Characterisation of BaM^{IV}(PO₄)₂ in the View of Conditioning of the Actinides

K. Popa, R.J.M. Konings, D. Bouëxière, A.F. Popa and T. Geisler

2012

Immobilization of Hafnium Surrogates in Fluorapatite

S.K. Fong, L.A. Gerrard, B.L. Metcalfe and I.W. Donald

2018

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