

## **BIODATA**

**Name** : Papiya Biswas

**Qualification** : PhD (Metallurgical and Materials Engineering) (2018) (National Institute of Technology Warangal)

**Designation** : Scientist - E

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**Experience** : 17 years

**Research Areas of Interest** : Transparent ceramics  
Glass-ceramics  
Chemical Vapour Deposition  
Advanced ceramic processing  
Colloidal shaping  
Hot Isostatic Pressing  
Additive Manufacturing

**List of Journal Publications (Peer Reviewed Journals)** : 50

**List of patents (Indian)** : 2

**Contribution to Book Chapters** : 4

**Affiliation to Professional Societies** : Life Member of Indian Ceramic Society  
Member of American Ceramic Society  
Indian Women Scientists' Association,  
Hyderabad

**Awards & Honors** : 5

**Number of B. Tech students /Graduate trainees Guided** : 12

## Technical Record

| Sl. No. | Projects completed and Ongoing                                                                                                                                            |
|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1       | Development of Low Expansion Glass Ceramics – <b>Ongoing (Sponsorer: RCI-VSSC)</b>                                                                                        |
| 2       | Development of SOFC-SOEC systems for power and hydrogen generation – <b>Ongoing (Sponsorer: CHT-OIDB)</b>                                                                 |
| 3       | Limited production and supply of transparent spinel domes– <b>Ongoing (Sponsorer: RCI, DRDO)</b>                                                                          |
| 4       | Development of transparent spinel ceramics for vehicle armor applications – <b>Completed (Sponsorer: NMRL, DRDO)</b>                                                      |
| 5       | Development of transparent spinel IR domes – <b>Completed (Sponsorer: RCI- PGAD, DRDO)</b>                                                                                |
| 6       | Development of Reagent Formulations and optimization of process for the Surface Cleaning of Low Expansion Glass Ceramics (LEGC) – <b>Completed (Sponsorer: RCI, DRDO)</b> |
| 7       | Transparent ZnS ceramics based IR domes and windows - <b>Completed (Sponsorer: RCI, DRDO)</b>                                                                             |
| 8       | Limited production of IR transparent ZnS ceramic blanks, lenses and domes- <b>Completed (Sponsorer: RCI &amp; VSSC)</b>                                                   |
| 9       | Development and supply of SWIR spinel domes – <b>Completed (Sponsorer: IRDE, DRDO)</b>                                                                                    |
| 10      | Development and supply of multimode spinel domes - <b>Completed (Sponsorer: RCI, DRDO)</b>                                                                                |
|         |                                                                                                                                                                           |
|         | <b>Technology Transferred</b>                                                                                                                                             |
| 11      | Technology on IR transparent ZnS domes                                                                                                                                    |
| 12      | Technology on MWIR transparent ZnS domes                                                                                                                                  |

## Major Strengths

- To develop transparent ceramics for IR and visible wavelength range applications
- To develop ceramic 3D printed components for waste management and medical application
- To develop porous ceramics with engineered porosity for thermal management application
- To develop dense ceramics for energy application

## Experimental Skills

- Hot Isostatic Pressing
- Colloidal processing
- Chemical vapour deposition
- Ceramic 3D printing – additive manufacturing
- Complex shaping of ceramics
- Cold isostatic pressing
- Rheology
- FTIR
- Zeta potential

## List of Peer-reviewed Publications (50)

1. Effect of Striae on the high temperature dielectric and electrical properties of Lithium aluminium Silicate Glass Ceramics, Madireddy Buchi Suresh, **Papiya Biswas**, Dulal Chandra Jana, C. Venkateswaran, Mahendra Kumar Gupta, Bhaskar Prasad Saha, Roy Johnson, *Ceramics International* (2024) (under review)
2. Processing of lithium aluminium silicate glass-ceramics and investigations of fracture behaviour and its correlation with the microstructural features, **Papiya Biswas**, Madireddy Buchi Suresh, Dulal Chandra Jana, Bhaskar Prasad Saha, Roy Johnson, *Ceramics International* 50 (2024) 4708–4714, **Impact Factor: 5.532**
3. Fabrication of optically transparent MgAl<sub>2</sub>O<sub>4</sub> polycrystalline ceramics and evaluation of high temperature dielectric, impedance spectroscopy & AC conductivity, Madireddy Buchi Suresh, **Papiya Biswas**, Bhaskar Prasad Saha, Roy Johnson, *Journal of Materials Science: Materials in Electronics* 34 (2023) 1877 1-12, **Impact Factor: 2.779**
4. Digital Light Processing of Ceramics: An Overview on Process, Materials and Challenges, Sirisala Mamatha, **Papiya Biswas**, Roy Johnson, *Progress in Additive Manufacturing* 8 (2023) 1083-1102, **Impact Factor: 4.97**
5. Tunable luminescence and oxygen defects of the spinel MgAl<sub>2</sub>O<sub>4</sub>: Eu<sup>3+</sup>/Eu<sup>2+</sup> for photonic application, Shiv Prakash Singh, **Papiya Biswas**, Roy Johnson, *Materials* 26 (2022) 101624, **Impact Factor: 3.44**
6. Colloidal Shaping of Transparent Spinel through Slip Casting Using Contamination Free Spinel Moulds, Shiv Prakash Singh, **Papiya Biswas** and Roy Johnson, *Transactions of Indian Ceramic Society* 81 (2022) 30-36, **Impact Factor: 2.355**
7. Comparative Evaluation of Colloidal and Dry Forming under Pressure and Pressure-less Conditions of Al<sub>2</sub>O<sub>3</sub> Ceramics, P. Raju, **Papiya Biswas**, Asit Kumar Khanra, Y. Srinivasa

- Rao and Roy Johnson, *Processing and Application of Ceramics* (2022) , **Impact Factor: 1.36**
8. 3D Printing of MgAl<sub>2</sub>O<sub>4</sub> Spinel Mesh and Densification through Pressure-less Sintering and Hot Isostatic Pressing, Aparna Adumbukulath, Crystal Shin, Ghanashyam S Acharya, **Papiya Biswas**, Sirisala Mamatha, Roy Johnson and Gade Padmanabham, *3D Printing and Additive Manufacturing* (2021) <http://doi.org/10.1089/3dp.2021.0034>, **Impact Factor: 5.355**
  9. Comparative Study on Compaction and Sintering Behavior of Spray and Freeze Granulated Magnesium Aluminate Spinel Powder, Swathi Manivannan, **Papiya Biswas**, Prasenjit Barick, Sweety Kumari, Bhaskar Prasad Saha and Roy Johnson, *Transactions of Indian Ceramic Society* 80 (2021) 1-8, **Impact Factor: 2.355**
  10. In vitro evaluation of magnesium aluminate [MgAl<sub>2</sub>O<sub>4</sub>] spinel ceramic based polyphasic composite scaffold for craniofacial bone tissue engineering, Anu Sharma, Manu Krishnan, Gurudatta Ganganahalli, Seema Saraswathy, **Papiya Biswas**, Roy Johnson, Kurian Mathew Abraham, Satish R. Iyer, *Ceramics International* 47 (2021) 13678–13692, **Impact Factor: 5.532**
  11. Effect of parameters on 3D printing of alumina ceramics and evaluation of properties of sintered parts, Sirisala Mamatha, **Papiya Biswas**, Pandu Ramavath, Dibakar Das and Roy Johnson, *Journal of Asian Ceramic Societies* 9 (2021) 858-864, **Impact Factor: 3.579**
  12. 3D printing of high surface area ceramic honeycombs substrates and comparative evaluation for treatment of sewage in phytoid application, **Papiya Biswas**, Sirisala Mamatha, Kezil Varghese, Roy Johnson, Ritesh Vijay, Rakesh Kumar, *Journal of Water Processing Engineering* 37 (2020) 101503 1-6, **Impact Factor: 7.34**
  13. Studies on correlation of surface properties, colloidal shaping and transparency of magnesium aluminate spinel powder, **Papiya Biswas**, Swathi Manivannan, Y. Srinivasa Rao, Roy Johnson, *Materials Chemistry and Physics* 252 (2020) 123372, **Impact Factor: 4.778**
  14. 3D printing of cordierite honeycomb structures and evaluation of compressive strength under quasi-static condition, Sirisala Mamatha, **Papiya Biswas**, Dibakar Das, Roy Johnson, *International Journal of Applied Ceramic Technology* 17 (2020) 211-216, **Impact Factor: 2.328**
  15. Fabrication of complex shaped ceramic articles from 3D printed polylactic acid templates by replication process, Sirisala Mamatha, **Papiya Biswas**, Dibakar Das, Roy Johnson, *Ceramics International* 45 (2019) 19577-19580, **Impact Factor: 5.532**
  16. 3D Extrusion Printing of Magnesium Aluminate Spinel Ceramic Parts Using Thermally Induced Gelation of Methyl Cellulose, **Papiya Biswas**, Sirisala Mamatha, Subhendu Naskar, Yabaluri Srinivasa Rao, Roy Johnson and Gadhe Padmanabham, *Journal of Alloys and Compounds* 770 (2019) 419-423, **Impact Factor: 6.371**

17. 3D printing of complex shaped alumina parts, Sirisala Mamatha, **Papiya Biswas**, Pandu Ramavath, Dibakar Das, Roy Johnson, *Ceramics International* 44 (2018) 19278-19281, **Impact Factor: 5.532**
18. Mechanical Behavior of Alumina based Reticulated Foams Encapsulated and Infiltrated with Polymer under Quasistatic and Dynamic Conditions, Kanike Rajesh, Vattaparambil Shipin, **Papiya Biswas**, Asit Kumar Khanra and Roy Johnson, *Transactions of Indian Ceramic Society* 77 (2018) 1-4, **Impact Factor: 2.355**
19. Thermal degradation of ceramic slurry-coated polyurethane foam used in making reticulated porous SiC ceramics, Atanu Dey, **Papiya Biswas**, Vignaswaran K. Veerapandiyan, Nijhuma Kayal, Roy Johnson, Omprakash Chakrabarti, *Journal of Thermal Analysis and Calorimetry* 131 (2018) 2603-2610, **Impact Factor: 4.755**
20. Effect of Room and High Temperature Compaction on Optical and Mechanical Properties of HIPed Transparent Spinel Ceramics, **Papiya Biswas**, Pandu Ramavath, Chandrashekhar Sadasiv Kumbhar, Dinesh S. Patil, Tapas Kumar Chongdar, Nitin Madhusudan Gokhale, Roy Johnson and Mantravadi Krishna Mohan, *Advance Engineering Materials* 19 (2017) 1700111-1 – 1700111-7, **Impact Factor: 4.12**
21. Flash-sintering of Magnesium Aluminate Spinel (MgAl<sub>2</sub>O<sub>4</sub>) Ceramics, Hidehiro Yoshida, **Papiya Biswas**, Roy Johnson, *Journal of the American Ceramic Society* 100 (2017) 554-562, **Impact Factor: 4.19**
22. Comparative evaluation of electrical conductivity of hydroxyapatite ceramics densified through ramp and hold, spark plasma and post sinter Hot Isostatic Pressing routes, M. Buchi Suresh, **P. Biswas**, V. Mahender, Roy Johnson, *Materials Science and Engineering C* 70 (2017) 364–370, **Impact Factor: 8.457**
23. Development of Cordierite based Reticulated Foams with Improved Mechanical Properties for Porous Burner Applications, **P. Biswas**, K. Varaprasad, P. Ramavath, M. Buchi Suresh, A. K. Khanra, R. Johnson, *Transactions of Indian Ceramic Society* 76 (2017) 56-61, **Impact Factor: 2.355**
24. Fabrication of MgAl<sub>2</sub>O<sub>4</sub> Spinel Scaffolds and Sonochemical Synthesis and Deposition of Hydroxyapatite Nanorods, **Papiya Biswas**, Anu Sharma, Manu Krishnan, Roy Johnson, Mantravadi Krishna Mohan, *Journal of the American Ceramic society* 99 (2016) 1544–1549, **Impact Factor: 4.19**
25. Fabrication of graphite contamination free polycrystalline transparent MgAl<sub>2</sub>O<sub>4</sub> spinel by spark plasma sintering using platinum foil, **Papiya Biswas**, Dibyendu Chakravarty, M. Buchi Suresh, Roy Johnson, *Ceramics International* 42 (2016) 17920–17923, **Impact Factor: 5.532**

26. Quasi-static compression behavior of nickel oxide, nickel oxide: zirconia, nickel:zirconia and nickel foams, **Papiya Biswas**, Pandu Ramavath, Chandhana Muraleedharan Nair, Madireddy Buchi Suresh, Nakula Ravi, Roy Johnson, *Ceramics International* 42 (2016) 10572–10578, **Impact Factor: 5.532**
27. Prediction and validation of buckling stress ( $\sigma_{cr}$ ) of the ceramic honeycomb cell walls under quasi-static compression, Pandu Ramavath, **Papiya Biswas**, Nakula Ravi and Roy Johnson, *Cogent Engineering* 3 (2016) 1168068 1-7
28. Fabrication of IR Transparent Zinc Sulphide Plate by Chemical Vapor Deposition (CVD), **Papiya Biswas**, Pandu Ramavath, Roy Johnson, Kurisett Venkata Ravi, *Indian Journal of Chemical Technology* 23 (2016) 400-404
29. Sonochemical Synthesis of Nano-Structured Hydroxyapatite with unique morphologies and Evaluation of Sintering Kinetics, **Papiya Biswas**, Bandhakavi Lakshmi Sindhura, Chandhana Muraleedharan Nair, Pandu Ramavath, Madireddy Buchi Suresh and Roy Johnson, *Journal of Advances in Chemistry* 11 (2015) 3789-3797
30. Processing of Alumina Honeycomb Catalyst Substrates and Studies on Methyl Cellulose Binder Burn Out Kinetics, **Papiya Biswas**, Y.S. Rao and Roy Johnson, *Journal of Advanced Catalysis Science and Technology* 2 (2015) 38-43
31. Binder burnout and sintering kinetic study of alumina ceramics shaped using methylcellulose, K. Rajeswari, S. Chaitanya, **P. Biswas**, M. Buchi Suresh, Y.S. Rao and Roy Johnson, *Journal of Ceramic Processing Research* 16 (2015) 24-31
32. Compaction Curves: A Tool for Qualitative Evaluation of Quasi-static Compaction Behavior of Ceramic Powders, Pandu Ramavath, **Papiya Biswas**, P. Suresh Babu, P. Laxminarayana and Roy Johnson, *The Australian Ceramic Society* 51 (2015) 130-136, **Impact Factor: 1.741**
33. Transparent Magnesium Aluminate Spinel: A Prospective Biomaterial for Esthetic Orthodontic Brackets, Manu Krishnan, Brijesh, Vimal Arora, **Papiya Biswas**, K Rajeswari, M B Suresh, Roy Johnson, *Journal of Materials Science: Materials in Medicine* 25 (2014) 2591-2599, **Impact Factor: 4.727**
34. Optical and mechanical properties of compaction and slip cast processed transparent polycrystalline spinel ceramics, Pandu Ramavath, **Papiya Biswas**, Kotikalapudi Rajeswari, Madireddy Buchi Suresh, Roy Johnson, Gadhe Padmanabham, Chandrashekhar Sadasiv Kumbhar, Tapas Kumar Chongdar, Nitin Madhusudan Gokhale, *Ceramics International* 40 (2014) 5575–5581, **Impact Factor: 5.532**
35. Colloidal Shaping of 8 mol% Ytria Stabilized Zirconia Electrolyte Honeycomb Structures by Microwave Assisted Thermal Gelation of Methyl Cellulose, K. Rajeswari, **P. Biswas**, M.

- B. Suresh, D. Das, U. S. Hareesh and R. Johnson, *International Journal of Applied Ceramic Technology* 11 (2014) 154-163, **Impact Factor: 2.328**
36. Hot isostatic pressing of ZnS powder and CVD zinc sulphide ceramics and comparative evaluation of physico-chemical, microstructural and transmission properties, P. Ramavath, **P. Biswas**, R. Johnson, G. J. Reddy, P. Laxminarayana, *Transactions of Indian Ceramic Society* 73 (2014) 299-302, **Impact Factor: 2.355**
37. Effect of Surface Passivation in Spinel Slurry towards Hydrolysis: Neutron Scattering and Rheological Studies, K. Rajeswari, **Papiya Biswas**, Roy Johnson, S. Prabhudesai, V.K. Sharma, S. Mitra and R. Mukhopadhyay, *Journal of Dispersion Science and Technology* 35 (2014) 1442-1448, **Impact Factor: 2.057**
38. Fabrication of Transparent Spinel Honeycomb Structures by Methyl Cellulose based Thermal Gelation Processing, **P. Biswas**, K. Rajeswari, P. Ramavath, Roy Johnson, H. S. Maiti, *Journal of The American Ceramic Society* 96 (2013) 3042–3045, **Impact Factor: 4.19**
39. Extrusion processing of Dense MgAl<sub>2</sub>O<sub>4</sub> Spinel Honeycombs with Low Relative Density, **P. Biswas**, K. Rajeswari, V. Mahendar and Roy Johnson, *Ceramics International* 39 (2013) 9819–9821, **Impact Factor: 5.532**
40. Transparent Sub-micrometer Alumina from Lanthanum Oxide Doped Common Grade Alumina Powder, **Papiya Biswas**, Madugula Kiran Kumar, Kotikalapudi Rajeswari, Roy Johnson and Unnikrishnan Nair Saraswathy Hareesh, *Ceramics International* 39 (2013) 9415–9419, **Impact Factor: 5.532**
41. Thermally Induced Gelation of Alumina Shaping- Neutron Scattering and Rheological Measurements, **Papiya Biswas**, K. Rajeswari, S. Chaitanya, Roy Johnson, S.A. Prabhudesai, V.K. Sharma, S. Mitra and R. Mukhopadhyay, *Open Journal of Inorganic Chemistry* 3 (2013) 48-54
42. Experimental Investigation on Flowability and compaction behavior of Spray granulated submicron Alumina Granules, Abhisek Choudhary, Pandu Ramavath, **Papiya Biswas**, Nukula Ravi and Roy Johnson, *ISRN Ceramics* 2013 (2013) 1-6
43. Diametral Deformation Behaviour and Machinability of Methyl Cellulose Thermal Gel cast Processed Alumina Ceramics, **P. Biswas**, M. Swathi, P. Ramavath, K. Rajeswari, M. Buchi Suresh, Roy Johnson, *Ceramic International*, 38 (2012) 6115-6121, **Impact Factor: 5.532**

44. Mechanical Properties of Transparent Polycrystalline Alumina Ceramics Processed Using an Environmentally Benign Thermal Gel Casting Process, G. Sundararajan, **P. Biswas** and N. Eswara Prasad, *Experimental Mechanics*, 53 (2012) 123-129, **Impact Factor: 2.794**
45. Transparent Polycrystalline Ceramics: An Overview, R. Johnson, **P. Biswas**, P. Ramavath, R.S. Kumar and G. Padmanabham, *Transaction of Indian Ceramic Society*, 71 [2] (2012) 73-85, **Impact Factor: 2.355**
46. Low Temperature In-situ Reaction Sintering of Zircon: Alumina Composites Trough Spark Plasma Sintering, M. C. Anjali, **P. Biswas**, D. Chakravarty, U. S. Hareesh, Y.S. Rao and R. Johnson, *Science of Sintering*, 44 (2012) 323-330
47. Colloidal Shaping of Alumina Ceramics by Thermally Induced Gelation of Methylcellulose, Unnikrishnan Nair Saraswathy Hareesh, Rakesh Anantharaju, **Papiya Biswas**, Kotikalapudi Rajeswari, Roy Johnson, *Journal of American Ceramic Society* 94 [3] (2011) 749–753, **Impact Factor: 4.19**
48. Effect of Sphalerite to Wurtzite Crystallographic Transformation on Microstructure, Optical and Mechanical Properties of Zinc Sulphide Ceramics, P. Ramavath, **P. Biswas**, R. Senthil Kumar, V. Mahendar, G. V. N. Rao, U. S. Hareesh and R. Johnson, *Ceramic International*, 37 (2011) 1039-1046, **Impact Factor: 5.532**
49. Effect of post CVD thermal treatments on crystallographic orientation, microstructure, mechanical and transmission Properties of ZnS Ceramics, **P. Biswas**, R. Senthil Kumar, P. Ramavath, V. Mahendar, G. V. N. Rao, U. S. Hareesh and R. Johnson, *Journal of Alloys Compounds*, 496 (2010) 273-277, **Impact Factor: 6.371**
50. Effect of Bauxite Addition on Densification and Mullitization Behaviour of West Bengal Clay, N S Raut, **P Biswas**, T K Bhattacharya and K Das, *Bulletin of Material Science*, 31 [7] (2008) 995–999, **Impact Factor: 1.878**

### **List of Patents (02)**

1. Process of preparation of zinc sulphide free standing article by chemical vapour deposition. R. Senthil Kumar, P. Ramavath, **P. Biswas**, U. S. Hareesh and R. Johnson  
Indian patent (Granted) (Patent document no. 276019)
2. A novel process for producing IR transparent polycrystalline alumina articles and the articles so produced.  
**P. Biswas**, K. Rajeswari, V. Mahender, P. Ramavath, A. Rajashekhar Reddy, R. Johnson, U. S. Hareesh  
Application No.: 365/DEL/2012, Filing date: 08-02-2012



### **Book Chapters (04)**

1. Zinc Sulphide Ceramics for Infrared Optics, Roy Johnson, **Papiya Biswas**, Pandu Ramavath and Yashwant R. Mahajan, Handbook of Advanced Ceramics and Composite Applications, (ed.) Y.R. Mahajan and Roy Johnson, Springer Nature, Vol. 1, p 533-567, 2020
2. Processing of Infrared Transparent Magnesium Aluminate Spinel: An Overview, **Papiya Biswas**, Roy Johnson, Yashwant R. Mahajan, Gadhe Padmanabham, Handbook of Advanced Ceramics and Composites, (ed.) Y.R. Mahajan and Roy Johnson, Springer Nature, Vol. 1, p 495-531, 2020
3. Patenting trends in additive manufacturing of ceramic materials, Priya Anish Mathews, K. Swati, Sanjay Bhardwaj, **Papiya Biswas**, Roy Johnson and G. Padmanabham, Handbook of Advanced Ceramics and Composites (ed.) Y. R. Mahajan and Roy Johnson, Springer Nature, Vol. 1, p 319-354, 2020
4. Transparent Ceramics for Ballistic Armor Applications, Senthil Kumar Rajendran, **Papiya Biswas**, Roy Johnson, and Yashwant Ramachandra Mahajan, Handbook of Advanced Ceramics and Composites, (ed.) Y. R. Mahajan and Roy Johnson, Springer Nature, Vol.1 , p 435-457, 2020

### **List of Awards & Honors (05)**

1. Dr. R. L. Thakur Memorial Award -2016 for young scientist for contribution in the field of advanced ceramic science and technology
2. IRMA Award from Indian Refractory Makers Association for proficiency in studies in ceramic sciences for the year of 2005-2006
3. 2<sup>nd</sup> best award for oral presentation in the Platinum Jubilee Annual Session of the Indian Ceramic Society in 2011
4. Technology Award 2012 from ARCI for the successful development of ZnS domes
5. 1<sup>st</sup> best award in oral presentation in the International Conference on Expanding Horizons of Technological Applications of Ceramics and Glasses (EH-TACAG'17) organised by Indian Ceramic Society in 2017