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Facilitation Centre for Industrial Plasma Technologies

Institute for Plasma Research

Gandhinagar



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Field of Work

- Plasma Processing and Applications
- Plasma Pyrolysis/Gasification
- Plasma Sterilization
- Plasma Surface Modifications of Metal/Alloys/Textiles/Polymers
- Plasma Activation of Water
- Plasma Enhanced Chemical Vapour Deposition (PECVD)

Projects and Technologies

- PECVD to deposit Glass Like Coating on Brass Articles
- Plasma pyrolysis of Biomedical Waste
- Plasma Gasification of Organic Waste to recover energy
- Plasma treatment of Angora wool and textiles
- Plasma Surface modification of polymers
- Plasma Activation of Water & Medium
- Plasma sterilization of medical components

Recent Publications

- V. Rathore, D. Patel, N. Shah, S.K. Nema. Inactivation of *Candida albicans* and Lemon (*Citrus limon*) Spoilage Fungi Using Plasma Activated Water. *Plasma Chem Plasma Process* **41**, 1397–1414 (2021). <https://doi.org/10.1007/s11090-021-10186-3>
- V.Rathore, B.S.Tiwari, S.K. Nema, Treatment of Pea Seeds with Plasma Activated Water to Enhance Germination, Plant Growth, and Plant Composition. *Plasma Chemistry & Plasma Processing* **42**, 109–129 (2022). <https://doi.org/10.1007/s11090-021-10211-5>
- Vikas Rathore and Sudhir Kumar Nema, "A comparative study of dielectric barrier discharge plasma device and plasma jet to generate plasma activated water and post-discharge trapping of reactive species", *Physics of Plasmas* **29**, 033510 (2022) <https://doi.org/10.1063/5.0078823>

	<ul style="list-style-type: none"> • Vikas Rathore and Sudhir Kumar Nema, “Design and Development of Dielectric Barrier Discharge Setup to form plasma activated water and optimization of process parameters”, <i>The European Physical Journal D</i> (springer nature) • “Experimental studies on applications of atmospheric pressure air plasma for ecofriendly processing of textiles and allied material" Nisha Chandwani, Vishal Jain, Purvi Dave, Hemen Dave, P. B. Jhala and Sudhir K. Nema submitted to (Springer) <i>Journal of The Institution of Engineers (India): Series E</i> • Vikas Rathore, Divyesh Patel, Shital Butani, Sudhir Kumar Nema, “Investigation of Physicochemical Properties of Plasma Activated Water and its Bactericidal Efficacy” Plasma Chemistry and Plasma Processing Vol.:(0123456789) https://doi.org/10.1007/s11090-021-10161-y • Vikas Rathore, Sudhir Kumar Nema; “Optimization of process parameters to generate plasma activated water and study of physicochemical properties of plasma activated solutions at optimum condition” J. Appl. Phys. 129, 084901 (2021); https://doi.org/10.1063/5.0033848 • “Antimicrobial finishing of hide/leather by atmospheric pressure plasma and extracts of <i>Cassia renigera</i> and <i>Cassia fistula</i> bark” Mona Vajpayee, M. Singh, H. Dave, N. Chandwani, L. Ledwani, S. K. Nema; <i>Rendiconti Lincei. Scienze Fisiche e Naturali</i>, 2020 https://doi.org/10.1007/s12210-020-00954-2 (Springer), sept 2020. • "Investigation of Antimicrobial Activity of DBD Air Plasma Treated Banana Fabric Coated with Natural Leaf Extracts" Mona Vajpayee, Mumal Singh, Lalita Ledwani, Ram Prakash, Sudhir K. Nema; <i>Journal: ACS Omega</i> (July 2020).
Awards/Recognition	<ul style="list-style-type: none"> • Received Dr. Vikram Sarabhai Award in May 2005 in the field of “Environment” for the work on "Safe Disposal of Hospital Waste by Plasma Pyrolysis". Gujarat Council of Science & Technology (Gujcost) confer this award every year to the scientists/researchers for the development of novel technology which benefits to state or society. • IPR has nominated for The National Academy of Sciences, India (NASI) Award 2010, NASI – Reliance Industries Platinum Jubilee Awards for <i>APPLICATION ORIENTED INNOVATIONS</i> covering both Physical & Biological Sciences