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(71)**Name of Applicant :**

1)Dr. Raj Kumar Gupta

Address of Applicant :Assistant Professor, Department of Physics, Sardar Vallabhbhai Patel College, Bhabua, Kaimur VKSU, Ara, Bihar, India. ----------- -----------

2)Dr. Jaidev Kumar

3)Dr. Divya Tyagi

4)Dr. Manoj. R. Sonawane

5)Dr. C. Prabakaran

6)Kumar Raj Chittranjan Singh

7)Dr. M Anitha

8)Dr. Amit Chauhan

9)Kavitha J

10)Dr. P. Sangaiya

11)Sudhir Kumar

12)Pappu Kumar

Name of Applicant : NA

Address of Applicant : NA

(72)**Name of Inventor :**

1)Dr. Raj Kumar Gupta

Address of Applicant :Assistant Professor, Department of Physics, Sardar Vallabhbhai Patel College, Bhabua, Kaimur VKSU, Ara, Bihar, India. ----------- -----------

2)Dr. Jaidev Kumar

Address of Applicant :Assistant Professor, Department of Chemistry, Hariom Saraswati, P. G. College, Dhanauri, Haridwar, Roorkee, Uttrakhand, India. ----------- -----------

3)Dr. Divya Tyagi

Address of Applicant :Professor, Department of Chemistry, School of Basic and Applied Science, Sanskaram University, Jhajjar, Haryana, India. ----------- -----------

4)Dr. Manoj. R. Sonawane

Address of Applicant :Assistant Professor, Department of Applied Sciences & Humanities, SVKM's Institute of Technology, Survey No. 499, Plot. No. 02, Behind Gurudwara, Mumbai Agra National Highway, Dhule, 424001, Maharashtra, India. ----------- -----------

5)Dr. C. Prabakaran

Address of Applicant :Assistant Professor, Department of Environmental Sciences, ICAR-KVK, Thiruvarur, Needamangalam, Tamilnadu -614404, India. ----------- -----------

6)Kumar Raj Chittranjan Singh

Address of Applicant :Assistant Professor, Department of Physics, Narayan Mahavidyalaya, Gorea Kothi, Siwan, Bihar, India. ----------- -----------

7)Dr. M Anitha

Address of Applicant :Assistant Professor, Department of EEE, St.Joseph's College of Engineering, OMR, Chennai, Tamilnadu- 600119, India. ----------- -----------

8)Dr. Amit Chauhan

Address of Applicant :Department of Life Sciences, CHRIST University, Bengaluru, Karnataka, India. ----------- -----------

9)Kavitha J

Address of Applicant :Assistant Professor (Sr. G), Department of Chemistry, Jai Shriram Engineering College, Avinashipalayam, Tirupur, Tamilnadu- 638660, India. ----------- -----------

10)Dr. P. Sangaiya

Address of Applicant :Assistant Professor, Department of Physics, V.S.B. Engineering College, Karur, Tamil Nadu, India. ----------- -----------

11)Sudhir Kumar

Address of Applicant :Research Scholar, Department of Physics, Sardar Vallabhbhai Patel College, Bhabua, Kaimur, VKSU, Ara, Bihar, India. ----------- -----------

12)Pappu Kumar

Address of Applicant :Research Scholar, Department of Physics, Sardar Vallabhbhai Patel College, Bhabua, Kaimur, VKSU, Ara, Bihar, India. ----------- -----------

(57) Abstract :

The invention discloses La-Co co-doped $BiFeO_3$ nanomaterials that exhibit significantly enhanced energy storage efficiency. By incorporating lanthanum (La) and cobalt (Co) into the $BiFeO_3$ matrix, the material achieves improved charge-discharge performance, higher energy density, and increased stability compared to undoped $BiFeO_3$. The invention includes a sol-gel synthesis method for producing these nanomaterials, optimized doping levels, and demonstrates their effectiveness in various energy storage devices, including supercapacitors and batteries. This advancement addresses current limitations in energy storage materials and offers a more efficient solution for a wide range of applications.

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