

(12) PATENT APPLICATION PUBLICATION

(19) INDIA

(22) Date of filing of Application :19/04/2024

(21) Application No.202441031317 A

(43) Publication Date : 26/04/2024

(54) Title of the invention : NODE-REINFORCED, STRUT-BASED DIAMOND METAL LATTICE STRUCTURES FOR LIGHTWEIGHT BIOMEDICAL AND ENERGY APPLICATION COMPONENTS

(51) International classification	:B22F0010200000, B33Y0010000000, B22F0005000000, B22F0010000000, B22F0003110000	(71) Name of Applicant : 1)Shivakumar Natarajan Address of Applicant :S/O Natarajan 3/97(1) Middle Street Vannarapettai thanjavur thalukka Vannarapettai Chief Vannarapettai ----- Name of Applicant : NA Address of Applicant : NA
(86) International Application No	:NA	(72) Name of Inventor :
Filing Date	:NA	1)Mr. Shivakumar Natarajan Address of Applicant :Assistant Professor (SS), Department of Mechanical Engineering, Periyar Maniammai Institute of Science & Technology, Vallam, Thanjavur, Tamil Nadu-613403. Email: nanoshivam@gmail.com, Mobile: 9443259195. Thanjavur -----
(87) International Publication No	: NA	2)Dr. P. K. Srividhya Address of Applicant :Professor, Department of Mechanical Engineering, Periyar Maniammai Institute of Science & Technology, Vallam, Thanjavur, Tamil Nadu-613403. Email: srividya.aravazhi@gmail.com, Mobile: 9944495667. Thanjavur -----
(61) Patent of Addition to Application Number	:NA	3)Mr. R. Sasikumar Address of Applicant :B.Tech. (Final Year), Department of Mechanical Engineering, Periyar Maniammai Institute of Science & Technology, Vallam, Thanjavur, Tamil Nadu-613403. Email: sasi0302003@gmail.com, Mobile: 6380299509. Thanjavur -----
Filing Date	:NA	4)Mr. Rakesh R Address of Applicant :Assistant Professor (SS), Department of Electronics and Communication Engineering, Periyar Maniammai Institute of Science and Technology, Periyar Nagar, Vallam, Thanjavur, Tamil Nadu-613403. Email: rak2win@gmail.com, Mobile: 9944475095, 9500978139. Thanjavur -----
(62) Divisional to Application Number	:NA	5)Mr. K. Neethiyarasan Address of Applicant :B.Tech. (Final Year), Department of Mechanical Engineering, Periyar Maniammai Institute of Science & Technology, Vallam, Thanjavur, Tamil Nadu-613403. Email: neethiyarasan99@gmail.com, Mobile: 6374364463. Thanjavur -----
Filing Date	:NA	6)Mr. B. Sriram Address of Applicant :B.Tech. (Final Year), Department of Mechanical Engineering, Periyar Maniammai Institute of Science & Technology, Vallam, Thanjavur, Tamil Nadu-613403. Email: rsri30087@gmail.com, Mobile: 9345630994. Thanjavur -----
		7)Mr. A. Arulanthan Address of Applicant :M.Tech. (Renewable Energy), Department of Mechanical Engineering, Periyar Maniammai Institute of Science & Technology, Vallam, Thanjavur, Tamil Nadu-613403. Email: arulanathanmech@gmail.com, Mobile: 9790088735. Thanjavur -----

(57) Abstract :

This method encompasses the formation of a diamond-based metal lattice structure characterized by strut junctions that are integrated with spherical nodes. The process involves sequentially depositing layers of metallic powder, such as Ti6Al4V, and subsequently sintering these layers with a laser beam targeted at specific locations. This procedure is repeated until a node-reinforced metal lattice structure is achieved. Diamond lattice structures are structures built by repeating the diamond unit cell. The diamond unit cell is a unit cell with strut members disposed at 109.48° between all the strut members. These structures are ideal for lightweight components in windmill applications and biomedical implants, enhancing load-bearing capabilities and biocompatibility.

No. of Pages : 17 No. of Claims : 10