



सत्यमेव जयते

क्रम सं./SL No :033140704



पेटेंट कार्यालय, भारत सरकार

The Patent Office, Government Of India

पेटेंट प्रमाण पत्र

Patent Certificate

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फाइल करने की तारीख / Date of Filing

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पेटेंटी / Patentee

: JADAVPUR UNIVERSITY

प्रमाणित किया जाता है कि पेटेंटी को, उपरोक्त आवेदन में यथाप्रकटित *Speedy Heat-Induced Vacuum Assisted Process to Synthesize Quantum Dots* नामक आविष्कार के लिए, पेटेंट अधिनियम, 1970 के उपबंधों के अनुसार आज तारीख अगस्त 2024 के छब्बीसवें दिन से बीस वर्ष की अवधि के लिए पेटेंट अनुदत्त किया गया है।

It is hereby certified that a patent has been granted to the patentee for an invention entitled *Speedy Heat-Induced Vacuum Assisted Process to Synthesize Quantum Dots* as disclosed in the above mentioned application for the term of 20 years from the 26th day of August 2024 in accordance with the provisions of the Patents Act, 1970.


 अनुदान की तारीख : 16/06/2026
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 पेटेंट नियंत्रक
 Controller of Patents

टिप्पणी - इस पेटेंट के नवीकरण के लिए फीस, यदि इसे बनाए रखा जाना है, अगस्त 2026 के छब्बीसवें दिन को और उसके पश्चात प्रत्येक वर्ष में उसी दिन देय होगी।

Note. - The fees for renewal of this patent, if it is to be maintained, will fall / has fallen due on 26th day of August 2026 and on the same day in every year thereafter.

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(57) Abstract:

Speedy Heat-Induced Vacuum Assisted Process to Synthesize Quantum Dots The present invention discloses the synthesis process graphene quantum dots (GQDs) and carbon quantum dots (CQDs) of the same type. The precursor (nicotine/raw tobacco leave/ Palash Flower) is burned at 400° C to 500° C with a lab burner using vacuum pump on a cone-shaped sample holder. The produced vapor from the burn is then treated under DI water, which allows the vapor to release agglomerated polymers and fluorophores of the unreacted/half-reacted precursor into the DI water. The vapor cools down a bit during this process. The rest of the vapor is then collected in a reflux system to condense the vapor into aqueous solution. This condensed aqueous solution contains large amount of CQDs/GQDs which can be diluted using DI water. The required time for completing the whole process is under 1 minute. The average grain size of the produced CQDs/GQDs is 3.2116 nm and they are crystalline in nature. The present cheap and easy nature of the synthesis process is suitable for industry-scale production of CQDs/GQDs.