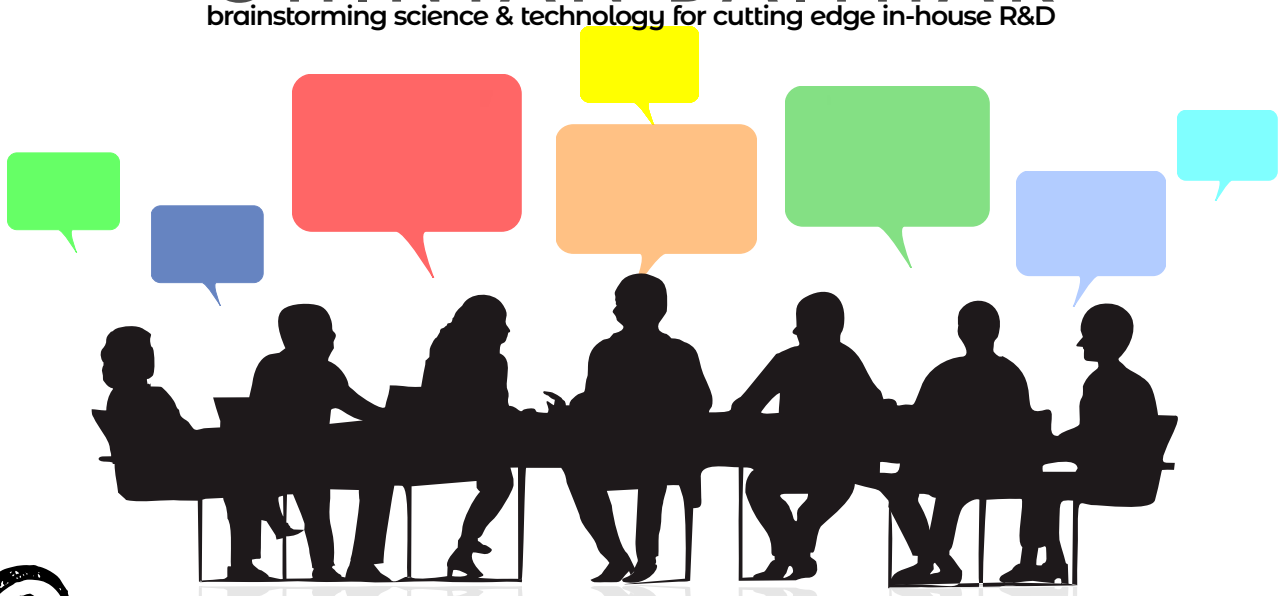
BARC CHINTAN BAITHAK

brainstorming science & technology for cutting edge in-house R&D



@National Green Hydrogen Mission

R&D IN SPOTLIGHT

Iodine-Sulfur process

High temperature intensive.

Thermochemical-cum-electrochemical water splitting.

Metallic closed loop structure.

Demonstrated nuclear hydrogen generation using integrated metallic closed loop process (@150 Nlph).

Copper-Chlorine process

Low temperature intensive.

Thermochemical-cum-electrochemical water splitting.

Metallic closed loop structure.

Demonstrated nuclear hydrogen generation using integrated metallic closed loop process (@5 Nlph).

The Bhabha Atomic Research Centre (BARC) over the years has piloted multidisciplinary in-house R&D activities in pursuit of India's National Mission for Green Hydrogen. Many of these activities have already resulted in scalable technology outcomes. A brief update on achievements so far alongside several noteworthy initiatives being pursued in BARC to meet the desired objectives of the mission in the short-term to long term period is presented here.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R&D IN FOCUS

Alkaline Water Electrolysis.

High Temperature Steam Electrolysis.

Proton Exchange Membrane.

Biological route (nitrogen fixing bacteria: Nostoc PCC7120).

Ammonia decomposition (membrane-assisted reactor).

NOVEL MATERIALS

Ti_2CrV alloy. Magnesium.

Metal hydrides.

WO_3 and (Er, W): $BiVO_4$ rich 2D heterojunction photoelectrode.

Membrane electrodes.

Photocatalysts: TiO_2, In_2TiO_5, g-C_3N_4.

TECH TRANSFER

Alkaline Water Electrolyzer.

TECH INCUBATION

PSU oil & gas giant BPCL.

Key resource persons

Dr. A. K. Tyagi, Director, Chemistry Group

Dr. Mrinal R. Pai, Chemistry Group

Speakers

1. Dr. A. K. Tyagi 2. Dr. Nafees Ahmed V.
3. Smt. Deepa Thomas 4. Dr. Atindra M. Banerjee

Contributors

Chemical Technology Group. Chemical Engineering Group. Chemistry Group. Materials Group. Bioscience Group.

@ Crystal Based Detector Program

Chalking out a roadmap for achieving self-sufficiency in advanced single crystal scintillator based radiation detectors, single crystal growth of semiconductor detectors, and lab-grown diamonds. A brief update on several noteworthy initiatives being pursued in BARC to meet the desired objectives of the ambitious program in the short-term to long term period is presented here.

Securing scintillator raw material supplies

Highly important $LaBr_3$ and $CeBr_3$ materials to be mass produced locally by leveraging IREL supply base of Lanthanum and Cerium

DAE's technological expertise to assist sustained hi-tech production efforts

Targeted time frame for localization: 5-7 years


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Speakers

1. Dr. S.M. Yusuf 2. Dr. Ranu Bhatt
3. Dr. Shreyas Pitale 4. Dr. Dheeraj Jain

Producing large diameter scintillator crystals

Proposed DAE-Crystal Growth Center (DAE-CGC) coming up near BARC (F) Visakhapatnam Centre in PPP model

Seamless industry-scientists networks for ensuring quick tech commercialization

Single Crystal Growth of Semiconductor Detectors

In-house manufacturing of HPGe crystal based Gamma detectors

Semiconductor-grade polycrystalline Si production at Heavy Water Board (Talcher)

DAE-CGC to aid efforts for making both HPGe detectors and 10-12 inch diameter Si single crystals

Meeting National Semiconductor Mission mandated goals

Lab-grown diamonds for advanced technology applications

High quality single crystal laboratory grown diamonds (LGDs) and large-area polycrystalline LGD