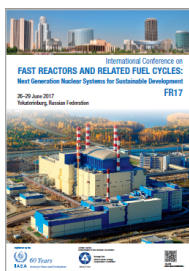


# International Conference on Fast Reactors and Related Fuel Cycles: Next Generation Nuclear Systems for Sustainable Development (FR17)



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## Indian Fast Reactor Programme : Status and R&D Achievements

*Tuesday, June 27, 2017 8:00 AM (30 minutes)*

Fast Breeder Reactors form the second stage of India's three stage Nuclear Power Programme based on the domestic nuclear resources. Indira Gandhi Centre for Atomic Research (IGCAR) is primarily dedicated for the broad based research & development of sodium cooled fast reactors, fuel cycle and associated technologies. India is operating a Fast Breeder Test Reactor (FBTR) since 1985, fuelled with a unique Pu rich mixed carbide fuel (70% PuC + 30% UC). It has so far completed 24 irradiation campaigns in its successful operation over thirty years. Fuels of all types viz. carbide, oxide as well as metal fuels (both binary and ternary) are currently under irradiation. FBTR has served as a test bed for various experiments, fuel and structural material irradiation, isotope generation programs. The mixed carbide fuel has demonstrated a record burnup of 165 GWd/t and it has been operated at 400 W/cm peak LHR and at higher operating temperatures. Currently, a 500 MWe Prototype Fast Breeder Reactor (PFBR) designed and developed by IGCAR, is in an advanced stage of commissioning. The design of PFBR incorporates several state-of-art features and is foreseen as an industrial scale techno-economic viability demonstrator for India's FBR program. IGCAR is presently engaged in the design of 600 MWe oxide fuelled FBRs incorporating many advanced features.

CORAL (COmpact Reprocessing of Advanced fuels in Lead cell) facility has reprocessed spent fuel discharged from FBTR with burnup up to 155 GWd/t and adequate decontamination has been demonstrated. Currently, a Demonstration fast reactor Fuel Reprocessing Plant (DFRP) is being established to process both MOX and mixed carbide fuels. A dedicated co-located Fast Reactor Fuel Cycle Facility (FRFCF) for PFBR is under construction. For the future, IGCAR has initiated development program on metallic fuel. Demonstration of fuel fabrication and pyroprocessing / aqueous technologies for metal fuels on an engineering scale is being pursued.

The R & D areas address all domains of fast reactor science and technology, including sodium technology, safety, materials development, fuel cycle, chemistry, sensors, advanced instrumentation and inspection. This paper presents an overview of the broad based R&D carried out by IGCAR in the domain of reactor technology, fuel cycle technology, materials development, basic sciences in support of fast reactor program, fuel chemistry, sodium technology, engineering development etc.

### Country/Int. Organization

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