



SATHI Foundation IIT Kharagpur

Fostering research-based innovation for Atmanirbhar Bharat
Scientific and Engineering Services in Advanced Materials

HRTEM (JEOL JEM ARM 300 F2)

The installed high resolution transmission electron microscope (JEM-ARM300F, JEOL) has ultra-resolution capability to detect atoms and spacing between atoms with a STEM resolution of 53 pm (and lattice resolution of 50 pm) at 300 kV. The system has several attachments such as an EDS detector to identify elements boron onwards while quantity, the elemental percentage and mapping inside a sample. Moreover, the attached EELS detector can obtain bonding information/environment, for example distinguishing diamond, graphite and other carbonaceous materials.



Photograph of the room that housed the aberration corrected high-resolution transmission electron microscope at SATHI Foundation IIT Kharagpur



Photograph of the microscope inside the box



Main Features

High-angle annular dark-field scanning transmission electron microscopy (HAADF-STEM) resolution of 53 pm

Expanding Trajectory Aberration (ETA) Corrector

High performance cold field emission gun provides high-resolution observation and analysis

Two types objective lens pole piece supports wide range of user requests

Wide range of accelerating voltage settings from 40 kV to 300 kV to adapt for wide field of applications.

Turbo-molecular pump is used for the pre-evacuation system minimizes contamination of specimen

Equipped with EDS and EELS for spectrum imaging and atom-by-atom analysis



Potential Industries

Steel and mining industries

Aerospace and space

Semiconductor industries

Renewable energy industries

Pharmaceutical industries

Gems and minerology



Application Areas

Structural properties of any materials

Chemical analysis

Semiconductors, metal and alloys

Glass, ceramics and cement

Energy materials

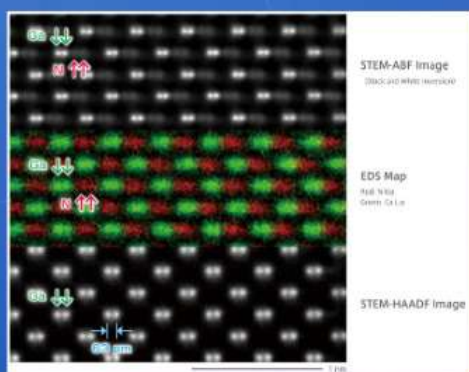
Low-dimension materials and plastics



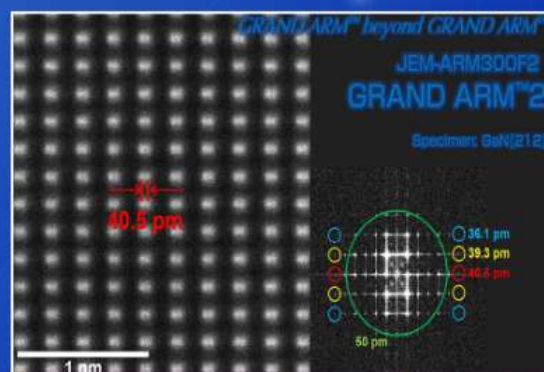
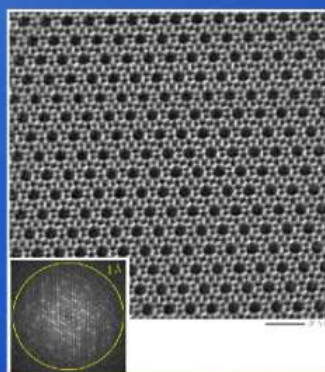
Brief Specifications

	Ultra-high resolution configuration	High resolution configuration
Objective lens pole piece		WGP
Std. acceleration voltage	300 kV and 80 kV	
Electron Gun	Cold field emission gun	
STEM resolution	300kV / 80kV STEM Cs corrector installed	
	53 pm / 96 pm	59 pm / 111 pm
TEM resolution	300kV / 80kV STEM Cs corrector installed	
	Lattice resolution 50 pm	Lattice resolution 60 pm

Selected Images



Atomic resolution STEM-HAADF/ABF images and EDS maps for GaN [211]



About SATHI Foundation IIT Kharagpur

Department of Science & Technology (DST), Government of India (GoI) has set up a Sophisticated Analytical and Technical Help Institute (SATHI) center at IIT Kharagpur (IIT KGP) to offer services such as Characterization, Testing, Fabrication, Scientific analysis/interpretation, generation of data & knowledge dissemination etc. to various external users including start-ups, MSMEs, large scale industry and academia.

SATHI IIT KGP center will be housing facilities for rapid prototyping, and smart fabrication, in addition to analysis and testing. It will also provide an opportunity for consultancy, training and various levels of collaboration with the stakeholders in the process.

The key theme of the SATHI Center at IIT Kharagpur, which will be managed by SATHI Foundation at IIT Kharagpur (a section 8 company) is Advanced Materials.

More details about the Center are available on the website <http://www.sathi.iitkgp.ac.in>

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