In this issue

Gamma-ray Telescope, Hanle

Makings of history

The first gamma ray telescope was set up by BARC at Mount Abu way back in 1997. The telescope, with a four-metre diameter collector, located 1300 metres above sea level, captured images of light from the cascade shower produced by very high energy gamma radiations, when they interact with atoms at high altitudes in the atmosphere. From the directions of the cascade, the sources of these cosmic radiations could be located. And India started contributing actively to gamma ray astronomy.

More than two decades later, the technologies changed. India's scientific capabilities too. Now BARC has set up another gamma ray telescope – the 21 metre quasi-parabolic reflector and higher resolution imaging technology – at Hanle, 4.3 kilometres above sea level. This telescope can detect gamma rays in the energy range of even up to a few tens of giga-electron volts with very high sensitivity. It extended the scope of gamma-ray astronomy many fold.

A General Article in this issue provides an account of the design, construction, testing, installing and commissioning of the world's highest gamma-ray telescope. The article also briefs us about the uses to which the telescope will be put and future plans of the nation in gamma-ray astronomy. Turn to **page 1428**.

Electric Vehicle Adoption

Charging station location

In spite of incentives given for electric vehicles, there is one criterion that limits largescale adoption by potential customers: while petrol filling stations are scattered all round the city in large numbers, charging stations for electric vehicles are far too few. Besides the anxiety of getting stranded in traffic, drivers are reluctant to travel long distances just for charging and then to have to wait in long queues...

Several models have been created to identify optimum locations for charging stations in cities. But unlike traffic in cities of the developed world which are more or less uniform, Indian cities have a mad medley of two-wheelers, three-wheelers, four-wheelers and commercial vehicles and the models developed for cities in developed countries cannot be applied to Indian cities.

So researchers from the CSIR-Central Road Research Institute, Roorkee and the L.D. College of Engineering, Ahmedabad came up with an indigenous model and used the case study of Delhi to test their model.

Decision makers for Indian cities may like to use the model to find optimum locations for charging stations. And so might entrepreneurs who plan to foray into the business of charging EVs. Turn to the Research Article on **page 1448**.

Reverse Osmosis

For safer groundwater supply?

Villagers in Eastern Karnataka depend primarily on groundwater for drinking. The region is a fluoride-endemic belt. And many groundwater sources contain uranium also. To reduce the impact of such contaminants in groundwater, the Government of Karnataka has installed thousands of reverse osmosis units in the state, mostly in the eastern parts of the state.

A Research Article in this issue examines the pros and cons of the initiative, based on evidence collected from fifteen villages distributed over four districts. The data shows that the majority of the villagers are not drinking the purified water. Most of the units installed do not reject contaminants completely, perhaps due to insufficient maintenance and repair. Moreover, since the rejection rate of fluorine is high, villagers who drink the purified water may face fluorine deficiency. Thus, the solution intended for protecting health may lead to a public health problem.

The authors point out an even more distressing factor: reverse osmosis technology rejects about three litres of water concentrated with contaminants for every litre purified. And this wastewater is allowed to percolate into groundwater, even emptied into unused bore wells, further contaminating groundwater.

Should we continue creating a bigger problem for future generations by supplying safer groundwater for people today? Isn't it time that we start exploring alternatives to reverse osmosis?

Read on from **page 1493** for details.

Improving Indoor Air Quality

Transparent air filter

A transparent air filter that can be mounted on windows to remove particulate matter, disarm microbes and neutralize organic pollutants. This is what researchers from four important institutions in the national capital region have to offer in a Research Article on **page 1486** in this issue.

Polyacrylonitrile polymer solution mixed with titanium dioxide nanoparticles is injected from a syringe, with high potential applied across the tip of the syringe and a steel mesh. This electrospinning method leaves a finer mesh of titanium dioxide impregnated nanofibres on the steel mesh – transparent but allowing air to pass through.

Though initiated as a low cost solution for the indoor air of poorer homes, the air filter has many other potential applications. More research and development is on the way, say the authors.

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