Prelim Bits 28-07-2021 | UPSC Daily Current Affairs

Bipyrazole Organic Crystals

- Researchers from the Indian Institute of Science Education and Research (IISER) Kolkata and IIT Kharagpur have developed a piezoelectric molecular crystal called **bipyrazole organic crystal.**
- [Piezoelectric crystals are a class of materials that generate electricity when it undergoes a mechanical impact.]
- These crystals recombine after mechanical impact or fracture without any external intervention, as they generate electrical charges on autonomously repair in milliseconds with crystallographic precision.
- This research has been supported by the Department of Science and Technology, GoI via Swarnajayanti Fellowship to CM Reddy and Science and Engineering Research Board (SERB) research grants.
- A custom-designed state-of-the-art polarization microscopic system was used to probe and quantify the perfection of the piezoelectric crystals.
- These materials with perfect internal arrangement of molecules or ions are called 'crystals', which are abundant in nature.
- **Significance** - The material may find application in high-end micro-chips, high precision mechanical sensors, actuators, micro-robotics, etc.

Moon-forming Region

- For the first time, scientists have spotted a moon-forming region around one of the two exoplanets (PDS 70c) orbiting an orange-coloured young star called PDS 70, which is located 370 light years from Earth.
- [Exoplanets are planets found outside our solar system. There are more than 4,400 exoplanets discovered.]
- [A light year is the distance light travels in a year, about 9.5 trillion km.]
- Exoplanet PDS 70c is surrounded by a disc of gas and dust massive enough to spawn three moons the size of the one orbiting Earth.
- ALMA observatory, Chile detected the disc of swirling material accumulating around one of two newborn exoplanets seen orbiting a star. It is called a circumplanetary disc from which moons are born.
- No circumplanetary discs had been found until now as all the known exoplanets resided in "fully developed" solar systems, except the two infant gas planets orbiting PDS 70.

- In our solar system, the rings of Saturn, which have more than 80 moons orbit it, represent a relic of a primordial moon-forming disc.
- **Observation** - The star PDS 70, roughly the same mass as our Sun, is about 5 million years old.
- The two planets, which orbit PDS 70, are even younger. Both the planets are at a dynamic stage i.e. they are still acquiring their atmospheres.
- The planet PDS 70c, which is orbiting the star PDS 70 at 33 times the distance of the Earth from the sun, has moon-forming disc that PDS 70c possesses has enough mass to produce up to three moons the size of Earth's moon.

Birth of a Moon

- Stars burst to life within clouds of interstellar gas and dust scattered throughout galaxies.
- Leftover material spinning around a new star coalesces into planets, and circumplanetary discs surrounding some planets similarly yield moons.
- The dominant mechanism that underpins planet formation is “core accretion”. In this scenario, small dust grains, coated in ice, gradually grow to larger sizes through successive collisions with other grains.
- This continues until the grains have grown to a size of a planetary core, at which point the young planet has a strong enough gravitational potential to accrete gas which will form its atmosphere.
- Some nascent planets attract a disc of material around them, with the same process that gives rise to planets around a star leading to the formation of moons around planets.

Arctic Lightning Storms

- Three successive thunderstorms swept across the icy Arctic from Siberia to north of Alaska, unleashing lightning bolts in unusual phenomenon.
- Typically, the air over the Arctic Ocean, especially when the water is covered with ice, lacks the convective heat needed to generate lightning storms.
- **Tripled in frequency** - But episodes of summer lightning within the Arctic Circle have tripled since 2010, due to climate change and increasing loss of sea ice in the far north.
- As sea ice vanishes, more water is able to evaporate, adding moisture to the warming atmosphere.
- In Alaska alone, thunderstorm activity is on track to increase threefold by the end of the century if current climate trends continue.
- **Impacts** - These electrical storms threaten boreal forests fringing the Arctic, as they spark fires in remote regions already baking under the round-the-clock summer sun.

- More frequent lightning will occur over the Arctic's treeless tundra regions, as well as above the Arctic Ocean and pack ice.
- On the water, the lightning is an increasing hazard to mariners, and vessel traffic is increasing as sea ice retreats.
- This is because generally people try to get low to be safe from lightning. But that's tough to do on flat tundra or ocean expanse.

Khasi Language

- The Central Government had received a proposal for inclusion of Khasi in the Eighth Schedule to the Constitution.
- Khasi language is the northernmost Austroasiatic language. It is the Mon-Khmer branch of Austroasiatic family. It is written using the Latin and Bengali-Assamese scripts.
- The main dialects of Khasi spoken are Sohra (Due to strong colonial patronisation, this dialect is regarded as Standard Khasi) and Shillong dialect (form a dialect continuum across the capital region).
- Khasi Language is spoken by Khasi people, an indigenous ethnic group of Meghalaya in north-eastern India.
- It is spoken primarily in Khasi Hills and Jaintia Hills region of Meghalaya state in India. It is also spoken by a sizeable population in Assam and Bangladesh.

Constitutional Provisions

- **Article 29** (Fundamental Right) of the Constitution provides that a section of citizens having a distinct language, script or culture have the right to conserve the same.
- Both the state and the citizens have an equal responsibility to conserve the distinct language, script and culture of a people.
- **Eighth Schedule** of the Constitution protects 22 languages.
- Members of Parliament (MPs) and Members of State Assemblies (MLAs) could speak in these lanugages in Parliament and State Assemblies.
- Candidates could write all-India competitive examinations like the Civil Services exam in these languages.
- These languages are recognised for the Sahitya Akademi.

National Commission for De-Notified and Nomadic and Semi-Nomadic Tribes

- This Commission was constituted in 2014 by the Ministry of Social Justice & Empowerment for the period of 3 years to
    1. Prepare a State-wise list of castes belonging to Denotified and Nomadic

Tribes and
2. Suggest appropriate measures in respect of Denotified and Nomadic Tribes that may be undertaken by the Central Government or the State Government.

- The Commission submitted its report in 2015. It recommended for the setting of up a Permanent Commission for these communities.
- But, in 2019, the Government had set up a Development and Welfare Board for De-Notified, Nomadic and Semi-Nomadic Communities (DWBDNCs) under the Societies Registration Act, 1860.
- DWBDNC, which is under the aegis of Social Justice Ministry, was set up for implementing development and welfare programmes for DNCs.

- Also, the Government has so far launched following welfare schemes for the benefits to DNTs,
  1. Dr. Ambedkar Pre-Matric and Post-Matric Scholarship for DNTs Boys and Girls.
  2. Nanaji Deshmukh Scheme of construction of Hostels for DNTs Boys and Girls.

Scheme for Economic Empowerment of DNT Communities

- A special scheme "Scheme for Economic Empowerment of DNT Communities (SEED)" has been approved for welfare of the DNCs.
- It has following four components:-
  1. To provide coaching of good quality for DNT candidates to enable them to appear in competitive examinations.
  2. To provide Health Insurance to them.
  3. To facilitate livelihood initiative at community level; and
  4. To provide financial assistance for construction of houses for members of these communities.

Palaeochannels

- Various studies carried out by Central Ground Water Board (CGWB) have found about the traces of palaeo-channels found in parts of the Rajasthan, Haryana, Punjab, Gujarat and Uttar Pradesh.
- CGWB in collaboration with National Geo-physical Research Institute (NGRI) takes up various studies with respect to palaeochannels as part of the National Aquifer Mapping and Management (NAQUIM) program.
- **Palaeochannel**, also known as palaeovalley or palaeoriver, is a geological term describing a remnant of an inactive river or stream channel that has been filled or buried by younger sediment.
- The sediments that the ancient channel is cut into or buried by can be

unconsolidated, semi-consolidated, consolidated or lithified.

National Aquifer Mapping and Management Programme

- It is being implemented by the Central Ground Water Board (CGWB).
- NAQUIM envisages mapping of aquifers (water bearing formations), their characterization and development of Aquifer Management Plans to facilitate sustainable management of Ground Water Resources.
- [Aquifers are the rocks in which groundwater is stored. They are typically made up of gravel, sand, sandstone or limestone.]
- It was initiated as a part of the Ground Water Management and Regulation Scheme to delineate and characterize the aquifers to develop plans for ground water management.

Source: PIB, The Hindu

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