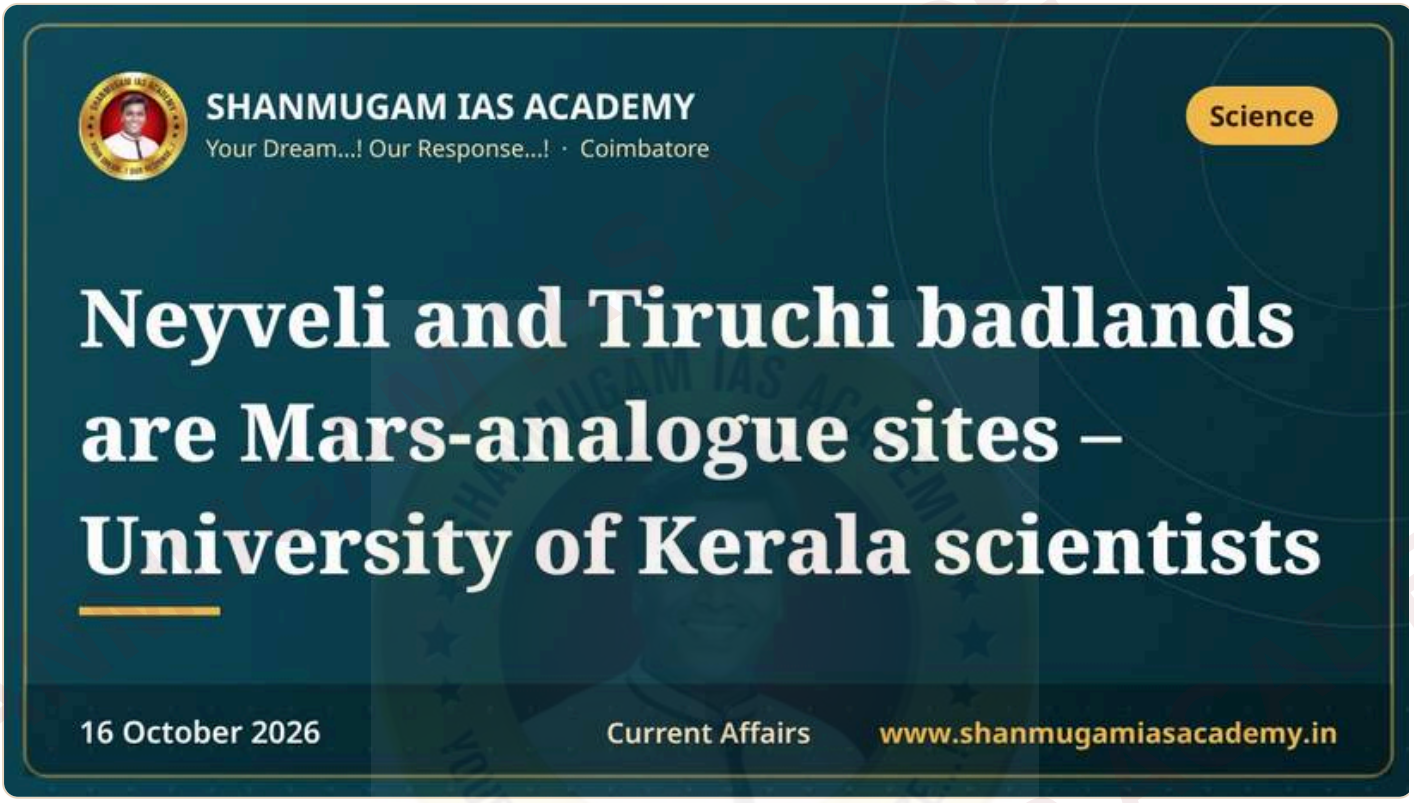
Neyveli and Tiruchi badlands are Mars-analogue sites – University of Kerala scientists

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News

A team led by Dr Sajin Kumar K.S. (DST-FIST Project Coordinator), Department of Geology, University of Kerala (Thiruvananthapuram), has identified Martian-analogue sites at Neyveli and the Tiruchirappalli badlands in Tamil Nadu and in Chile's Atacama Desert. Hydrous sulphate minerals – 'melanterite' (iron sulphate) formed from marcasite in the Neyveli lignite beds, and 'gypsum' at Tiruchi and Atacama – were confirmed with a laser Raman spectrometer. The work appeared as two papers in the 'Journal of Geophysical Research: Planets'; the Department of Science and Technology (DST) announced it on 16 Oct 2026.

Key facts

Institution	University of Kerala, Dept of Geology; led by Dr Sajin Kumar K.S.; funded by DST-FIST
Neyveli (Cuddalore dist.)	Melanterite ($FeSO_4 \cdot 7H_2O$) – formed within 23 days from marcasite (FeS_2) in lignite exposed to air; first record in Peninsular India
Tiruchi badlands	Gypsum ($CaSO_4 \cdot 2H_2O$) – semi-arid terrain; gypsum also at Atacama, Chile
Significance	Melanterite – short-lived wet, acidic conditions on Mars; gypsum – past water, may preserve biosignatures

Tool / journal	Laser Raman spectrometer; Journal of Geophysical Research: Planets (2 papers)

Background

- An analogue site is a place on Earth whose geology, chemistry or environment resembles another planet. ISRO's space analogue mission 'HOPE' (Himalayan Outpost for Planetary Exploration) was held in Ladakh's Tso Kar valley on 1–10 Aug 2025; India's first analog space mission had been held earlier at Leh in Nov 2024.
- Mangalyaan (Mars Orbiter Mission): launched on 5 Nov 2013 from Sriharikota by PSLV-C25; entered Mars orbit on 24 Sep 2014 – India was the first nation to succeed at the first attempt and the first in Asia.
- Science: Mars is the 'Red Planet' because of iron oxide on its surface; its moons are Phobos and Deimos; Olympus Mons is the tallest volcano in the Solar System. Sulphate minerals need water to form, so on Mars they are evidence of past water.
- Economy: Neyveli is India's key lignite mining centre; NLC India Ltd (a central PSU) runs mines and thermal power stations here.

Tamil Nadu link: anorthosite soil (similar to lunar soil) from Sithampoondi and Kunnamalai in Namakkal district has been supplied to ISRO since 2012 and used to test the Chandrayaan-2 lander and Chandrayaan-3's soft landing (with Periyar University, Salem). Now Neyveli and Tiruchi make Tamil Nadu a field for Mars studies too.

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