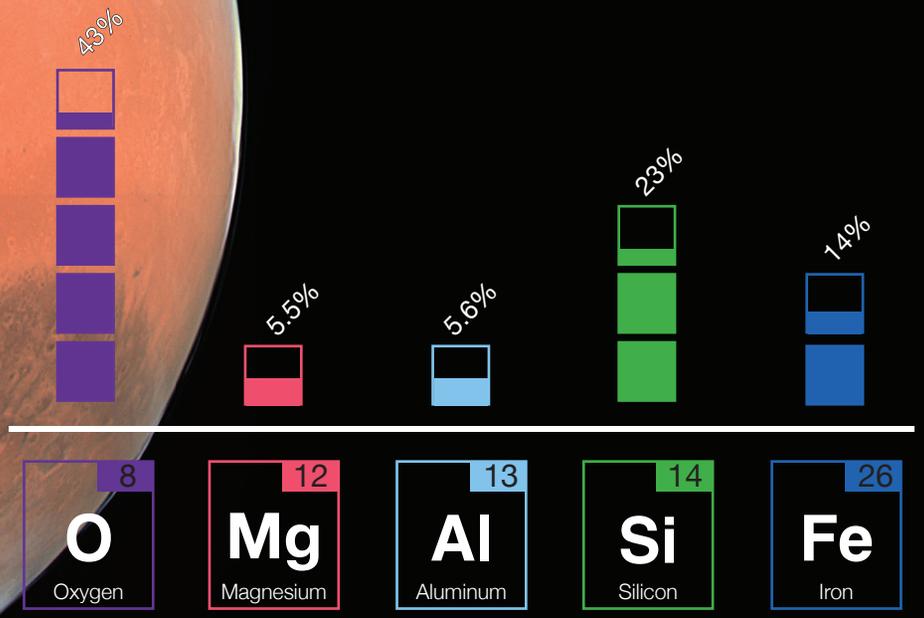
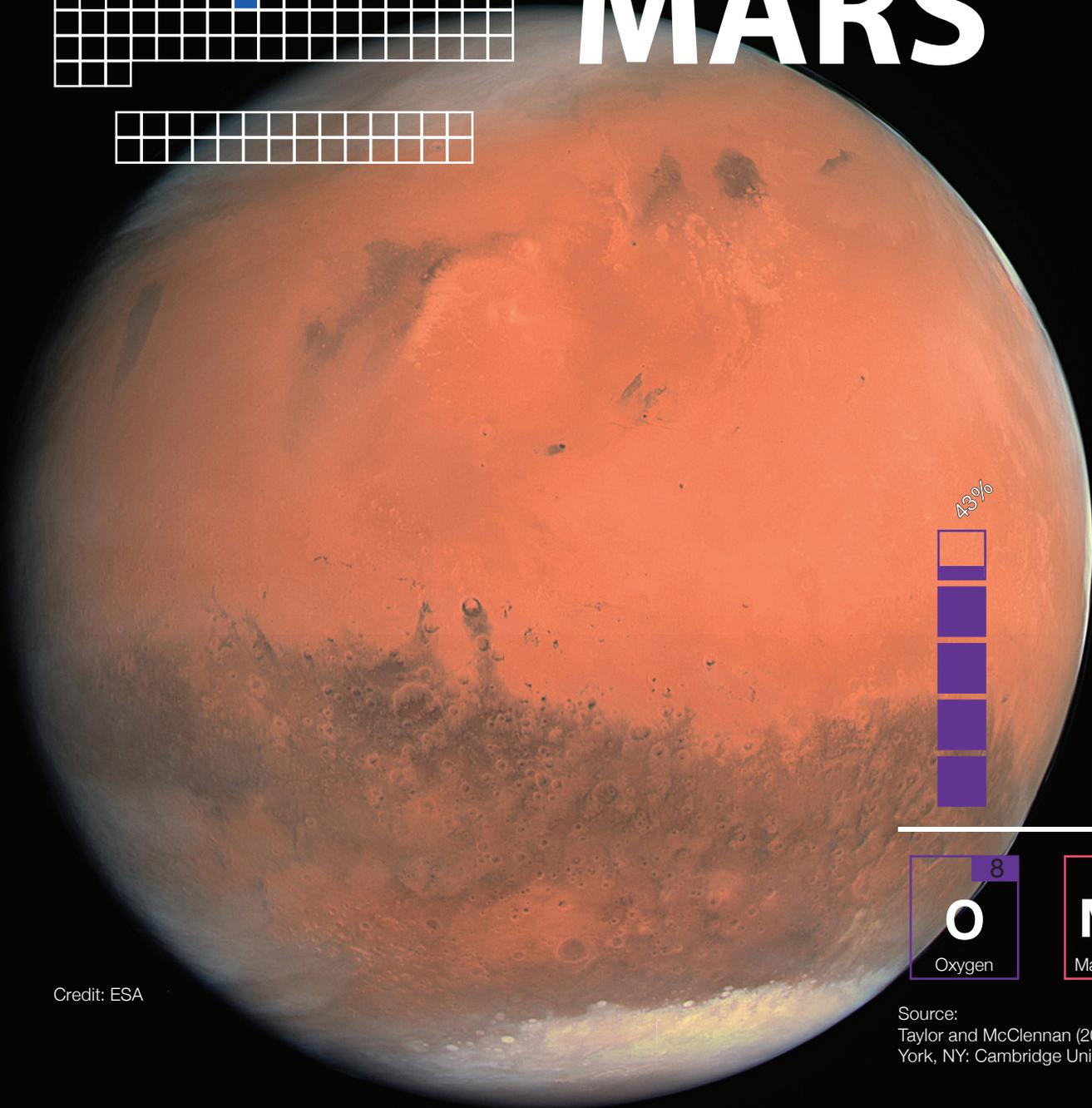


TOP 5 ELEMENTS IN THE CRUST OF MARS

LUNAR AND PLANETARY INSTITUTE



International Year of the Periodic Table of Chemical Elements



Credit: ESA

Source: Taylor and McClenan (2009). Planetary crusts: Their composition, origin, and evolution, New York, NY: Cambridge University Press.

MARS



View of the martian rock "Harrison." This is a composite of images from the Curiosity rover's MastCam and the ChemCam/Remote-Micro Imager (RMI). This composite image provides both color and microscopic details. Light-toned elongated features correspond to feldspar crystals up to 1 centimeter in length. Credit: NASA/JPL-Caltech/LANL/CNES/IRAP/LPGNantes/CNRS/IAS/MSSS.

Mars is the farthest terrestrial planet from the Sun. It is called the "Red Planet" for a very good reason: Its surface is enriched in iron oxides, which gives it a rusty color. Mars has been extensively studied by a combination of observations from orbiting spacecraft, surface analyses of rocks/soils with landers and rovers, and laboratory analyses of the shergottite-nakhlite-chassignite (SNC) family of meteorites. A unique characteristic of Mars is its iron-enriched crust, which contains twice as much iron as found in Earth's crust. This is the result of differences in composition of areas of the solar nebula where different planets formed. Another interesting feature about the composition of the Red Planet is that, in the past, Mars was thought to have a crust that was generally basaltic. However, our understanding has changed thanks to new observations from orbital instruments (such as OMEGA on the Mars Express orbiter), surface analyses from the Curiosity and Mars Exploration Rovers, and laboratory analyses of the martian meteorite "Black Beauty." All these observations have found rocks enriched in minerals (referred to as feldspars) common in magma types that were once thought to be absent on Mars. These analyses have also revealed minerals similar to those found in Earth's upper crust, which could indicate an early formation of a continental crust on Mars. However, due to a lack of evidence of tectonic plates on Mars, further investigation is needed to better determine how such rocks could have formed on Mars.



The year 2019 marks the 150th anniversary of Dmitri Mendeleev's development of the Periodic System and has been proclaimed the "International Year of the Periodic Table of Chemical Elements" (IYPT2019).

www.iypt2019.org

DR. AGNES COUSIN

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Dr. Agnes Cousin is a deputy astronomer and planetary scientist at the Institut de Recherche en Astrophysique et Planetologie (IRAP) in Toulouse, France. She has always been fascinated by space and the planets. She likes all of them, even though Mars is currently her focus. She is a geologist and an active member of the ChemCam team (an instrument onboard the Curiosity rover). Cousin wants to understand the formation and evolution of Mars by studying the origin and composition of martian rocks. Her research is mainly focused on igneous rocks, as well as the formation of soils. She participates in ChemCam instrument operations, which means several days per month she is responsible for the ChemCam data sent to Earth by the Curiosity rover — she has to make a report to answer the science rationale for each target sampled that day — or she is responsible for the choice of the targets to be sampled the next day. Her favorite task is to choose target rocks to observe one day, then look at the data from those observations the next! Cousin is also involved in the development of tools to help the ChemCam team analyze data, as well as developing experiments in the laboratory to better understand the data from Mars. For the last few years, she has been a member of the instrument team for SuperCam, which will be onboard the Mars2020 rover. She is responsible for the selection and fabrication of calibration targets. Cousin is involved in the scientific calibration of SuperCam, as well as the preparation of operations.



Founded at the height of the Apollo program in 1968, the Lunar and Planetary Institute (LPI) is an intellectual leader in lunar and planetary science. LPI's mission is to advance understanding of the solar system by providing exceptional science, service, and inspiration to the world. The research carried out at LPI supports NASA's efforts to explore the solar system.

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