
Mauna Kea, Hawaii

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Hi, I'm David Bish, co-investigator on the CheMin instrument on the Mars Science Laboratory and this is

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your Curiosity rover update.

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We've been spending some time in an area called Rocknest,

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and this week we delivered a scoop of a dune to Curiosity.

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CheMin performs what we call X-ray diffraction measurements on powdered rocks and soil samples.

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An X-ray diffraction is the best method for telling us what minerals are present

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in a rock or a soil because it is sensitive to the arrangements of atoms in minerals.

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As the X-rays strike the soil sample, CheMin shows us how mineral crystals distinctively interact with

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X-rays, and this image shows our first Xray diffraction results.

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The diffraction signals appear on the detector as rings that represent the fingerprint of the individual

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minerals. The rings tell us not only what minerals are present in the soil but also how abundant they are.

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The CheMin data provide us with distinctive signatures of the minerals: plagioclase feldspar, pyroxenes, and

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olivine. Peridot is a variety of olivine; just keep in mind that the olivine in the soil sample is much

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smaller than these crystals. Roughly half of the soil consists of poorly crystalline material, such as

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volcanic glass. Thus, this Martian soil appears very similar to some weathered basaltic soils

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that we see on Earth, in places like the flanks of Mauna Kea, Hawaii.

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You can appreciate how revolutionary CheMin is when you consider that instruments of this type

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on Earth are typically about the size of a double-wide refrigerator and the CheMin instrument

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on the Mars Science Laboratory is about the size of a shoebox.

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CheMin has been modified for use on Earth in places such as Antarctica and the Arctic.

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It's also been applied for the detection of counterfeit pharmaceuticals around the worlds

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and a modification of the instrument has been used in archeological studies

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to help us understand the nature of the surfaces and how we might protect them.

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In the coming weeks and months, we're excited to measure more X-ray diffraction