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00:00:02,480 --> 00:00:09,010

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

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00:00:09,010 --> 00:00:11,750

and this is your Curiosity rover update.

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00:00:11,750 --> 00:00:14,869

We have been spending some time in an area called Rocknest, and this week we delivered

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00:00:14,869 --> 00:00:16,980

a scoop of a dune to Curiosity.

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00:00:16,980 --> 00:00:22,700

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

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00:00:22,700 --> 00:00:26,250

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

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00:00:26,250 --> 00:00:31,320

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

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00:00:35,940 --> 00:00:41,130

interact with X-rays, and this image shows us our first X-ray diffraction results.

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00:00:41,130 --> 00:00:45,500

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

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00:00:45,500 --> 00:00:47,210

the minerals.

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00:00:47,210 --> 00:00:51,190
The rings tell us not only what minerals are present in the soil and but also how abundant

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00:00:51,190 --> 00:00:52,340
they are.

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00:00:52,340 --> 00:00:57,649
The CheMin data provide us distinctive signatures of the minerals plagioclase feldspar, pyroxenes,

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00:00:57,649 --> 00:00:58,660
and olivine.

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00:00:58,660 --> 00:01:00,940
Peridot is a variety of olivine.

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00:01:00,940 --> 00:01:05,379
Just keep in mind that the olivine in the soil sample is much smaller than these crystals.

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00:01:05,379 --> 00:01:09,750
Roughly half of the soil consists of poorly crystalline material, such as volcanic glass.

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Thus, this Martian soil appears very similar to some weathered basaltic soils that we see

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00:01:14,480 --> 00:01:18,040
on Earth, in places like the flanks of Mauna Kea, Hawaii

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00:01:18,040 --> 00:01:22,450
You can appreciate how revolutionary CheMin is when you consider that instruments of this

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00:01:22,450 --> 00:01:27,100

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

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00:01:27,100 --> 00:01:31,020

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

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00:01:31,020 --> 00:01:35,970

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

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00:01:35,970 --> 00:01:40,690

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

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00:01:40,690 --> 00:01:46,170

and a modification of the instrument has been used in archeological studies to help us understand

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00:01:46,170 --> 00:01:48,820

the nature of surfaces and how might we protect them.

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00:01:48,820 --> 00:01:53,050

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

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00:01:53,050 --> 00:01:56,730

soils and rocks to tell us more about the geology of Gale Crater.