
UNBOXING APOLLO SAMPLES

1
00:00:08,241 --> 00:00:08,541
So we

2
00:00:08,541 --> 00:00:10,877
received samples from the Apollo
17 mission

3
00:00:12,479 --> 00:00:15,415
which were return to Earth
in December of 1972.

4
00:00:15,448 --> 00:00:17,717
So nearly 50 years ago.

5
00:00:17,717 --> 00:00:19,886
Basically we collected on the moon
and brought back,

6
00:00:20,553 --> 00:00:23,790
then they were frozen within
about a month of being returned.

7
00:00:23,790 --> 00:00:25,825
So no one's ever looked at them since.

8
00:00:26,092 --> 00:00:27,761
It's very exciting.

9
00:00:35,769 --> 00:00:38,038
Curation facility at NASA's
Johnson Space Center

10
00:00:38,338 --> 00:00:41,908
sent us the samples and they did have to
do some special efforts to keep them cold

11
00:00:42,142 --> 00:00:43,209
because we wanted them to stay frozen.

12
00:00:43,209 --> 00:00:46,312
So they had a special cold shipping box
with panels

13
00:00:46,312 --> 00:00:49,416
that were frozen in a very cold freezer
and a chunk of dry ice.

14
00:00:51,117 --> 00:00:53,486
We picked it up from the receiving office
here at Goddard

15
00:00:55,522 --> 00:00:58,391
opened it up, pulled the samples out
and stuck them straight in our freezer

16
00:00:58,391 --> 00:00:59,492
and locked them up safely.

17
00:01:01,594 --> 00:01:02,495
So these

18
00:01:02,495 --> 00:01:05,432
frozen samples were actually collected
from a region on the moon

19
00:01:05,432 --> 00:01:07,434
that was in shadow from the sun.

20
00:01:07,434 --> 00:01:09,702
So it was basically a large boulder.

21
00:01:09,736 --> 00:01:11,504
In the near future,
we're going back to the moon

22
00:01:11,504 --> 00:01:13,306
and hopefully going to the polar
regions of the moon

23
00:01:13,306 --> 00:01:15,375
where some of these regions
are in permanent shadow

24
00:01:15,642 --> 00:01:18,078
and they don't see the sun, you know,
they're cold.

25
00:01:18,378 --> 00:01:22,215
These particular samples are really great
analogs for what we might expect

26
00:01:22,215 --> 00:01:24,517
to see in the polar regions
when we go back.

27
00:01:25,685 --> 00:01:28,321
So we actually started last week
to process the samples.

28
00:01:28,321 --> 00:01:33,126
So the samples we got are basically dirt,
lunar dirt, and we basically made "Moon

29
00:01:33,126 --> 00:01:34,027
tea" out of them.

30
00:01:34,027 --> 00:01:34,828
So "Moon tea"

31
00:01:34,828 --> 00:01:38,698
is what we call it when we pull out
the soluble compounds from the soil.

32
00:01:38,932 --> 00:01:42,669
And so we basically take the lunar sample,
seal it up with a torch in a little

33

00:01:42,669 --> 00:01:46,573
glass test tube full of water,
stick it in an oven overnight and boil it.

34
00:01:46,573 --> 00:01:49,442
And we're just pulling out
those soluble compounds that we care about

35
00:01:49,709 --> 00:01:51,644
the same way
you'd make tea with boiling water at home.

36
00:01:53,780 --> 00:01:56,182
What we're
trying to do is answer some questions

37
00:01:56,182 --> 00:02:00,253
about the history this sample experienced
at the surface of the moon.

38
00:02:00,353 --> 00:02:02,655
The surface of the moon
is a really hostile environment.

39
00:02:02,989 --> 00:02:05,658
You know, it's not like here on Earth
where we have this

40
00:02:05,658 --> 00:02:09,629
beautiful atmosphere that protects us
from the nasties of space.

41
00:02:09,662 --> 00:02:13,533
So we have particles from the sun
that are continuously hitting the

42
00:02:13,533 --> 00:02:14,367
surface of the moon.

43
00:02:14,367 --> 00:02:15,869

And we've got galactic

44
00:02:15,869 --> 00:02:19,539
cosmic rays that are coming in
and penetrating into the surface as well.

45
00:02:19,639 --> 00:02:23,643
They actually create noble gases
in these particles.

46
00:02:23,676 --> 00:02:26,012
So you can imagine that
there's none to begin with.

47
00:02:26,312 --> 00:02:29,649
And then as they get exposed
to this space environment,

48
00:02:29,916 --> 00:02:33,419
they kind of get more
and more buildup of noble gases.

49
00:02:33,820 --> 00:02:38,158
And our technique is to actually unlock
those noble gases from the sample,

50
00:02:38,324 --> 00:02:42,662
a measure of them, so we can come up with
what we call a cosmic ray exposure age.

51
00:02:43,029 --> 00:02:47,400
So it's basically how long this sample
has been sat at the surface being exposed.

52
00:02:47,567 --> 00:02:49,335
It's basically getting a "space tan."

53
00:02:50,703 --> 00:02:51,971
Say, 50 years ago,

54
00:02:51,971 --> 00:02:55,074
this same technique, which is called
the Noble Gas Mass Spectrometry

55
00:02:55,108 --> 00:02:59,579
would probably need anywhere,
you know, tens to hundreds of milligrams

56
00:02:59,579 --> 00:03:03,183
to do the same thing that we now
do with a couple of milligrams.

57
00:03:03,950 --> 00:03:06,553
It's really special
to be part of this, and particularly

58
00:03:06,553 --> 00:03:11,925
because I can look back at the papers
and the processes that the curation office

59
00:03:11,925 --> 00:03:15,662
and the scientists in the 1970s
thought about and they put so much care

60
00:03:15,662 --> 00:03:18,031
into preserving these samples
for future science

61
00:03:18,331 --> 00:03:20,533
to making sure
that they were going to be at their,

62
00:03:20,533 --> 00:03:23,303
you know, the best conditions
so that as we develop new techniques,

63
00:03:23,570 --> 00:03:27,006
we're able to go and look at these samples
and get new answers

64
00:03:27,273 --> 00:03:29,375
to the science questions
that were being asked.

65
00:03:29,375 --> 00:03:32,612
You know, I'm still studying these samples
50 years later

66
00:03:32,879 --> 00:03:35,515
for the from the Apollo mission,
the original Apollo missions

67
00:03:35,815 --> 00:03:38,885
and you know, you don't know
what's going to be in another 50 years,

68
00:03:38,885 --> 00:03:42,722
but I'm still a part of the Apollo dream
of going to the moon

69
00:03:42,722 --> 00:03:44,090
and bringing samples back.

70
00:03:44,090 --> 00:03:47,560
So the fact that we have Artemis
now is amazing.

71
00:03:47,560 --> 00:03:50,230
Like having our own Artemis
generation is really exciting.