

## Scientists turn CO2 emissions into stone

12th June, 2016



Scientists have come up with a smart but simple way to deal with carbon dioxide emissions, by turning them back into stone. Researchers in Iceland pumped 220 tons of CO2 deep underground into volcanic rock. It reacted

with minerals in the rock and over a relatively short space of time, transformed into a chalk-like solid substance similar to limestone. The team expressed their surprise at both the success and the speed of the CO2 conversion. Lead scientist Juerg Matter said: "Of our 220 tons of injected CO2, 95 per cent was converted to limestone in less than two years." He added: "It was a huge surprise to all the scientists involved in the project, and we thought, 'Wow! This is really fast'."

The scientists hope their experiment will be adapted on a larger, more industrial scale. It could help to alleviate the problem of growing CO2 emissions entering the atmosphere and warming the planet. It could also become a key technique in carbon capture and storage (CCS) solutions. Many other CCS techniques have involved injecting and trapping CO2 underground. However, there was always the problem of the emissions leaking their way back above ground and into the atmosphere. Dr Matter was enthusiastic about his team's experiments. He said: "We need to deal with rising carbon emissions and this is the ultimate permanent storage – turn them back to stone."

Sources: *BBC.com / the guardian.com / ScienceAlert.com*

## Writing

Countries should be heavily fined for not meeting CO2 reduction targets. Discuss.

## Chat

Talk about these words from the article.

scientists / simple / emissions / underground / volcanic / success / surprise / project / experiment / industrial / atmosphere / planet / carbon / storage / enthusiastic

## True / False

- The method to turn CO2 into stone is very complex and difficult. T / F
- Researchers in Iceland pumped 220kg of CO2 deep underground. T / F
- The substance the CO2 changes into is similar to coal. T / F
- Scientists were surprised at how fast the CO2 changed to stone. T / F
- Scientists hope people will now follow up their work on a larger scale. T / F
- Turning carbon into stone could be a new method of carbon storage. T / F
- This is the first technique to pump CO2 underground. T / F
- A scientist said this method was the ultimate in permanent storage. T / F

## Synonym Match

- |                 |                  |
|-----------------|------------------|
| 1. come up with | a. enormous      |
| 2. deal with    | b. comparatively |
| 3. relatively   | c. greatest      |
| 4. conversion   | d. reduce        |
| 5. huge         | e. passionate    |
| 6. alleviate    | f. handle        |
| 7. key          | g. seeping (out) |
| 8. leaking      | h. created       |
| 9. enthusiastic | i. crucial       |
| 10. ultimate    | j. change        |

## Discussion – Student A

- What do you think about what you read?
- How worried are you about CO2 emissions?
- How good an idea is turning CO2 back into stone?
- How harmful are carbon dioxide emissions?
- What would it be like to work on this experiment?
- What do you do to reduce carbon dioxide emissions?
- Why didn't scientists think of this before?
- When was the last time you thought, 'Wow!'?

## Phrase Match

- |   |                            |
|---|----------------------------|
| 1. Scientists have come up with a smart | a. rock                    |
| 2. carbon dioxide                       | b. back above ground       |
| 3. volcanic                             | c. involved in the project |
| 4. over a relatively short              | d. industrial scale        |
| 5. all the scientists                   | e. emissions               |
| 6. larger, more                         | f. capture and storage     |
| 7. warming                              | g. but simple way          |
| 8. a key technique in carbon            | h. the planet              |
| 9. emissions leaking their way          | i. storage                 |
| 10. the ultimate permanent              | j. space of time           |

## Discussion – Student B

- Why do some politicians say global warming is not man made?
- What other carbon storage solutions do you know of?
- How good is your country at dealing with carbon emissions?
- How would you deal with the problem of growing CO2 emissions?
- Why do so many countries not stick to CO2 emissions limits?
- Do the scientists deserve a Nobel Prize?
- Do you think this is the "ultimate permanent storage"?
- What questions would you like to ask the researchers?

## Spelling

- deal with carbon iodexd emissions
- into valnoicc rock
- It reacted with linrseam in the rock
- a chalk-like solid scnutseab
- the speed of the CO2 enovsorinc
- all the scientists ionvvdel in the project
- a larger, more lditnsairu scale
- help to laavielet the problem
- become a key eqhneictu
- carbon ceuprat and storage (CCS) solutions
- Dr Matter was unastethisic
- the ettumlai permanent storage

### Answers – Synonym Match

1. h	2. f	3. b	4. j	5. a
6. d	7. i	8. g	9. e	10. c

## Role Play

### Role A – Solar power

You think solar power is the greatest form of clean energy. Tell the others three reasons why. Tell them things that aren't as good with their power. Also, tell the others which is the least effective of these (and why): wind power, wave power or geothermal power.

### Role B – Wind power

You think wind power is the greatest form of clean energy. Tell the others three reasons why. Tell them things that aren't as good with their power. Also, tell the others which is the least effective of these (and why): solar power, wave power or geothermal power.

### Role C – Wave power

You think wave power is the greatest form of clean energy. Tell the others three reasons why. Tell them things that aren't as good with their power. Also, tell the others which is the least effective of these (and why): wind power, solar power or geothermal power.

### Role D – Geothermal power

You think geothermal power is the greatest form of clean energy. Tell the others three reasons why. Tell them things that aren't as good with their power. Also, tell the others which is the least effective of these (and why): wind power, wave power or solar power.

## Speaking – Clean energy

Rank these with your partner. Put the best clean energy partners often and share your rankings.

- |               |                     |
|---------------|---------------------|
| • solar power | • geothermal energy |
| • wind power  | • bio energy        |
| • wave power  | • human power       |
| • hydropower  | • heat pump         |

### Answers – True False

a	F	b	F	c	F	d	T	e	T	f	T	g	F	h	T
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Answers to Phrase Match and Spelling are in the text.