

Planet smash-up 'brought carbon to Earth'

5 September 2016 | Science & Environment



Much of Earth's life-giving carbon could have been delivered in a planetary collision about 4.4 billion years ago, a theory suggests.

Carbon is the key ingredient for all life on our planet.

But how Earth acquired its "volatile elements" - which have low boiling points - such as carbon and sulphur remains a subject of some debate.

A team now argues that a collision between Earth and an embryonic planet like Mercury could provide the answer.

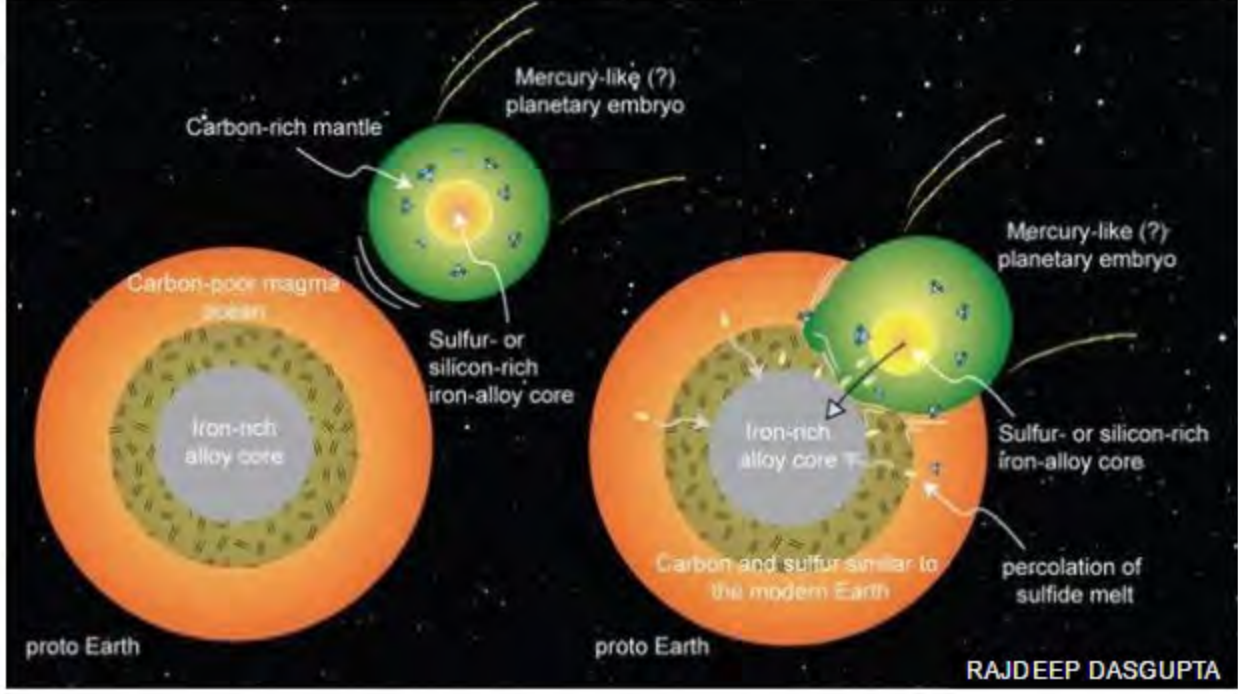
Details of the work appear in the journal Nature Geoscience.

"The challenge is to explain the origin of the volatile elements like carbon that remain outside the core in the mantle portion of our planet," said Rajdeep Dasgupta, a co-author of the study from Rice University in Houston, Texas.

According to a widely accepted idea called the Late Veneer Hypothesis, Earth formed from material that was largely devoid of volatiles. These elements, such as carbon, sulphur, nitrogen and hydrogen, were added later on by space rocks after Earth's core had finished forming.

"Any of those elements that fell to Earth in meteorites and comets more than about 100 million years after the Solar System formed could have avoided the intense heat of the magma ocean that covered Earth up to that point," said Yuan Li, from the Guangzhou Institute of Geochemistry at the Chinese Academy of Sciences.

"The problem with that idea is that while it can account for the abundance of many of these elements, there are no known meteorites that would produce the ratio of volatile elements in the silicate portion of our planet."



The group had previously published papers showing that if even if carbon had not vaporised into space when the planet was largely molten, it would have ended up in the metallic core of our planet - because the iron-rich alloys there have a strong affinity for carbon.

But if this is the case, where did the carbon in the mantle and biosphere come from?

The team used laboratory experiments that can recreate the high-pressure and high-temperature conditions that exist deep inside Earth and other rocky planets.

The found that one scenario that could reconcile the discrepancies in the carbon-to-sulphur ratio and carbon abundance was an embryonic planet like Mercury colliding with and being absorbed by Earth, early in its history.

"Because it's a massive body, the dynamics could work in a way that the core of that planet would go directly to the core of our planet, and the carbon-rich mantle would mix with Earth's mantle," said Dr Dasgupta.

Share this story

About sharing



Science & Environment >



Philae: Lost comet lander is found

5 September 2016 | Science & Environment



Pollution particles 'get into brain'

David Shukman
Science editor

5 September 2016 | Science & Environment



Alpine ice begins journey to Antarctica

5 September 2016 | Science & Environment

More Videos from the BBC

Recommended by Outbrain



Honour killing victim was raped, say Pakistani police



CEO Secrets: IT boss wants you to take 'moon shots'



Conjoined twins: 'To see how far they've come is amazing'



Car park collapses in Tel Aviv



Hundreds sign petition to save Aberaeron harbourmaster



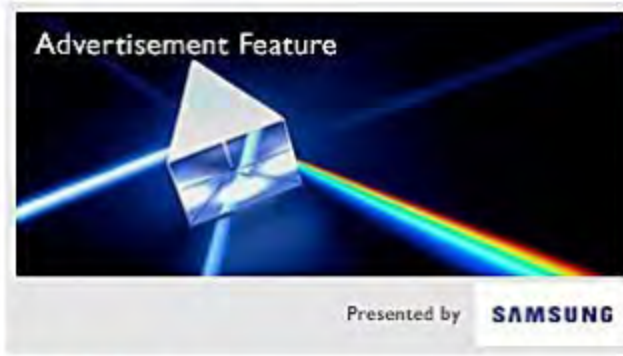
Brexit: Woman quits UK job to move to Poland

Elsewhere on BBC

Recommended by Outbrain



What is a quantum dot and how is it shaping our future?



How quantum dot technology was inspired by tenth century artists



Is an atom-sized crystal dot the answer to our biggest problems?



Where a simple photo changed a life



What would happen if all animals were as smart as us



Driverless taxis' human problem

Top Stories

Obama scraps talks after 'whore' jibe

US President Barack Obama calls off a meeting with Philippine President Rodrigo Duterte, who had earlier called him a "son of a whore".

1 hour ago

Pollution particles 'get into brain'

5 September 2016

Women 'do ask for pay rises'

8 hours ago

Features & Analysis



2:59

Dirty labs

What goes on inside a 'legal high' factory?



The cutest diplomat

How China saved the panda



Reel epic

Has a Bollywood film twisted history?



Food for sore eyes

What is the food that can really improve your eyesight?



Tidy bedroom triumph

Depression sufferer's bedroom clean-up is online hit



Diamond in dusty bowl

How Botswana has made the most of its resources



Golden crop

'Cocoa farming paid for my children's education'



Fracking fight

Why the Mapuche are opposing drilling



True crime

Web series showing vigilante justice resonates with Kenyans

Most Popular

Read	Watched
Obama scraps talks after 'whore' jibe	1
Protesters close London airport runway	2
US football star sacked after arrest	3
Depression sufferer's bedroom clean-up is online hit	4
What is the food that can really improve your eyesight?	5
Warner Bros reports own site as illegal	6
Brexit: The phoney war	7
Revenge porn prosecutions exceed 200	8
BA passengers delayed by computer glitch	9
Saying the unsayable: Philippine President Duterte	10

From Around the Web

Promoted content by Outbrain



London's Most Expensive Real Estate For Sale
Mansion Global



Ransomware: An ever-evolving menace
CSO



What A Million Dollars Can Buy You Around the...
Mansion Global by D...



Is your business ready for cybercrime?
The Guardian



Succession Plans for the British Monarchy
Dummies.com



Aged 35 he speaks 11 languages - his 11 tricks on how
Babbel

Ads by Google

University Ranking 2016
Ranked no.15 among ASEAN, no.1 in Thailand for exchange student
tu.ac.th

BBC News Services

- On your mobile
- On your connected tv
- Get news alerts
- Contact BBC News

Explore the BBC

News	Sport	Weather	Shop	Earth	Travel
Capital	Culture	Autos	Future	TV	Radio
CBBC	CBeebies	Food	iWonder	Bitesize	Music
Arts	Make It Digital	Taster	Nature	Local	