

Wildfires and Products of Burning

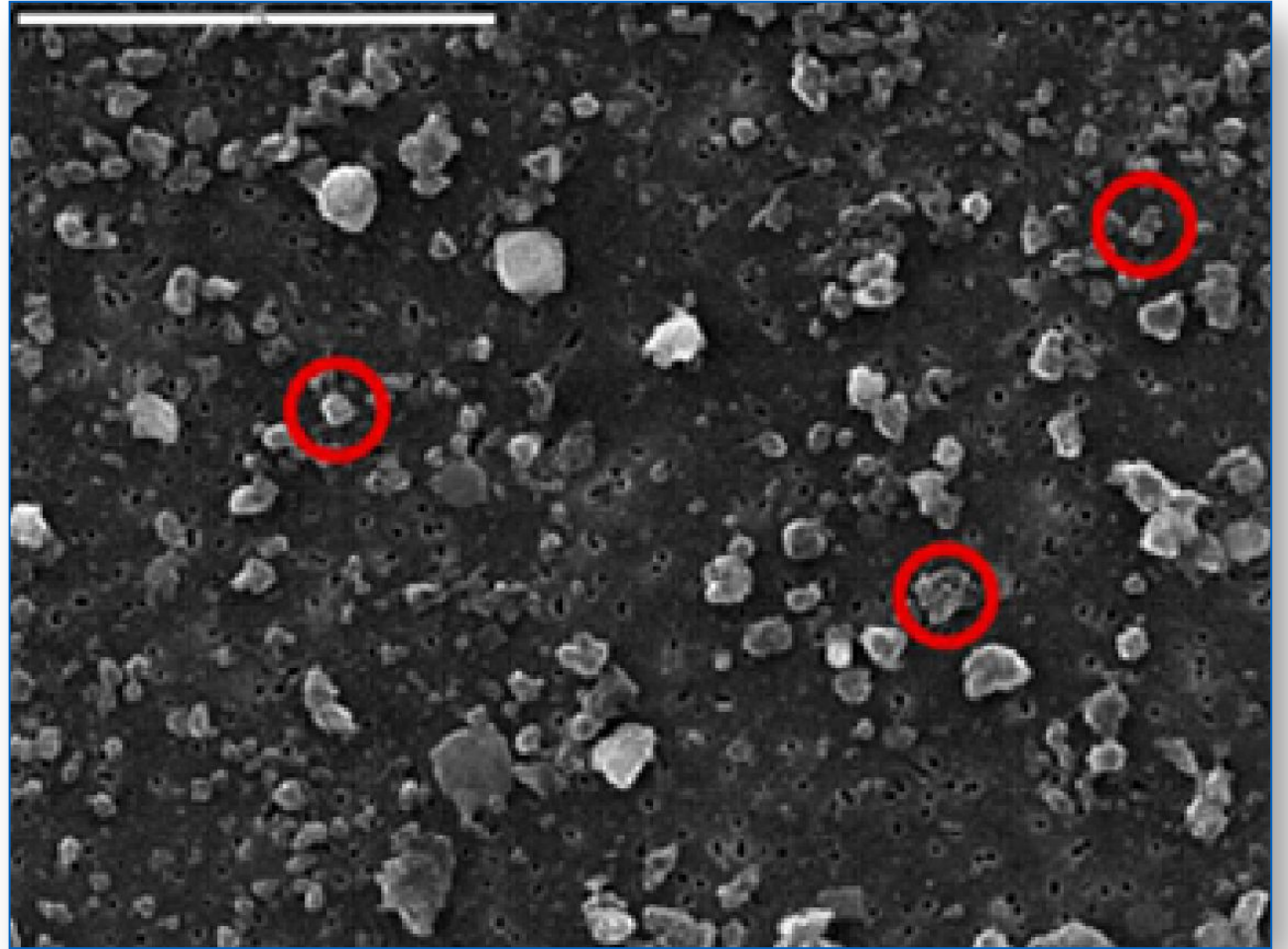
The YDB impact/airburst caused widespread wildfires

- Most all known large impacts created wildfires, including the K-Pg impact and the Tunguska airburst
- Both crater-forming impacts and non-cratering airbursts produce wildfires
- Wildfire products include charcoal, soot (aciniform carbon), carbon spherules, glass-like carbon, and fullerenes, as discussed in detail below
- Even though YDB fires were widespread, they were typically only as intense as normal wildfires, producing similar amounts of charcoal and soot
- However, YDB fires nearest the center of the impacts were much more intense, vaporizing carbon from plants and leaving few wildfire products

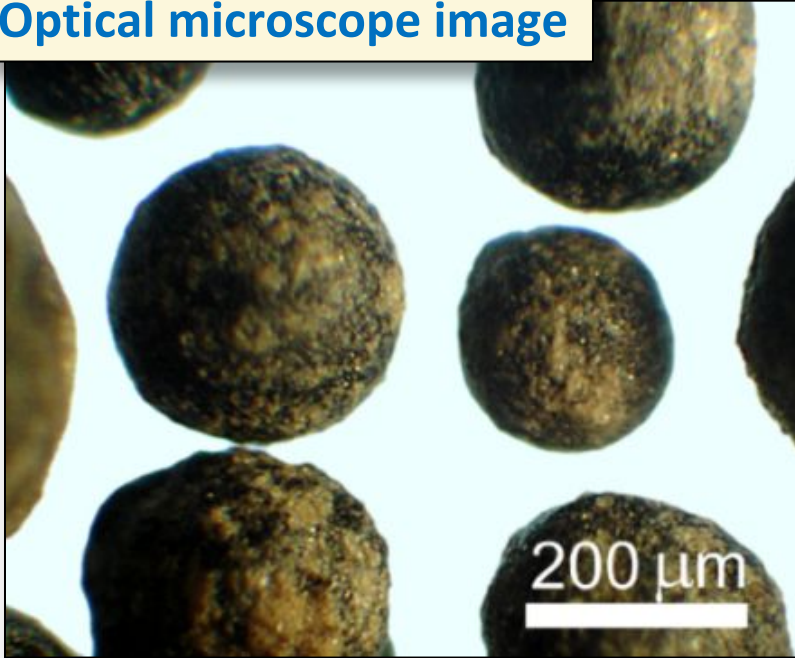
NOTE: this website is a brief, non-technical introduction to the YDB impact hypothesis. For in-depth information, go to “Publications” to find links to detailed scientific papers.

YDB Soot (aciniform carbon)

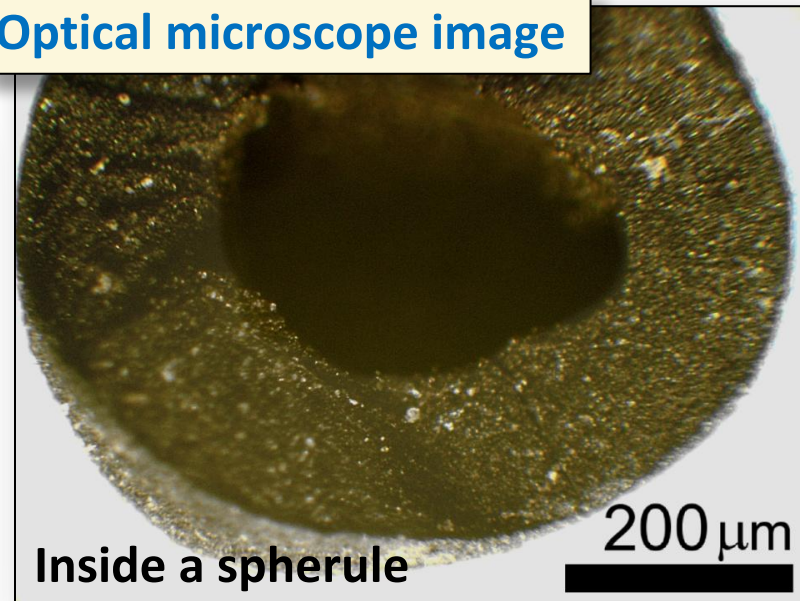
- ✓ Soot or elemental carbon is also called “aciniform carbon” because it clusters together like grapes. It is a strong indicator of a cosmic impact event.
- ✓ Circled particles (at right) show the shapes of soot, which forms when carbon vapor above a flame solidifies into solid carbon.
- ✓ Large quantities of soot formed in the dinosaur-killing K-Pg impact
- ✓ Soot is found in the YDB layer at about half of sites tested, but not above or below the impact layer.



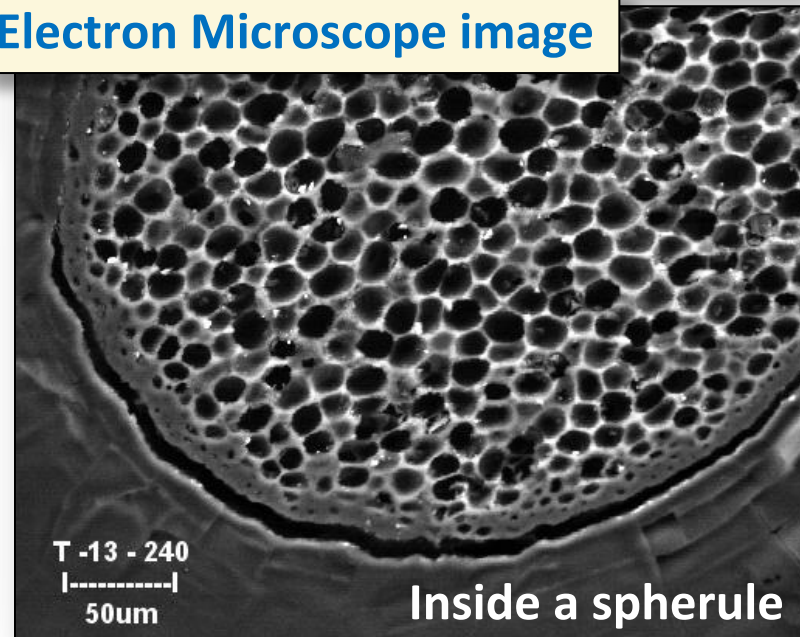
Optical microscope image



Optical microscope image



Electron Microscope image

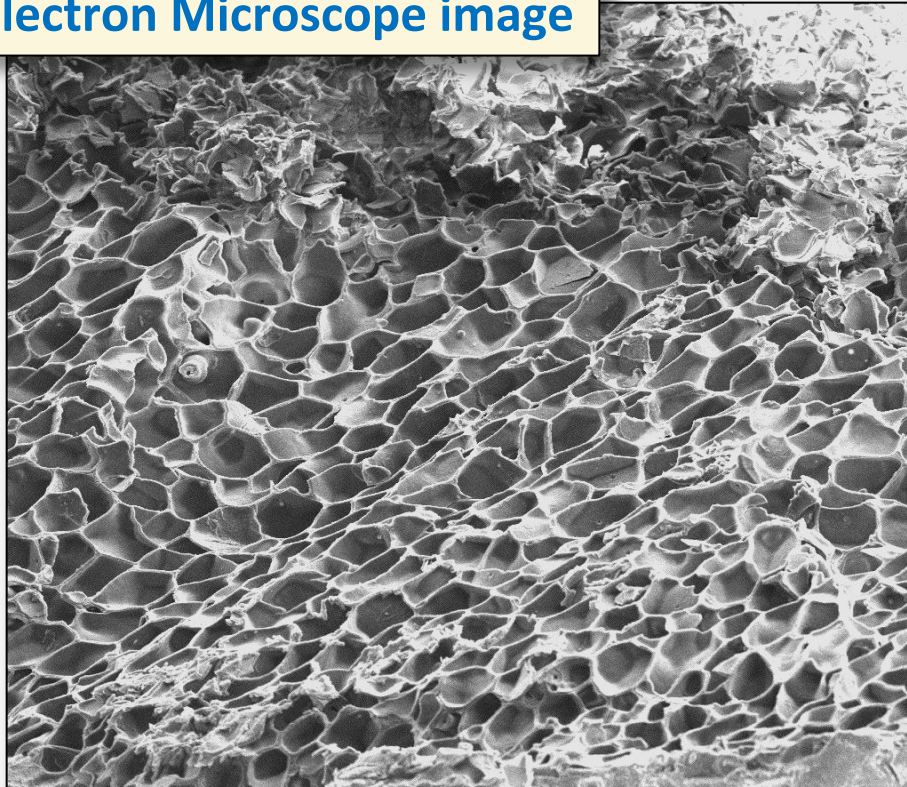


Carbon spherules

- Mostly carbon
- Size up to 3-4 mm (~1/8")
- Roughly spherical
- Hard shell, sometimes hollow
- Hard, spongy interior

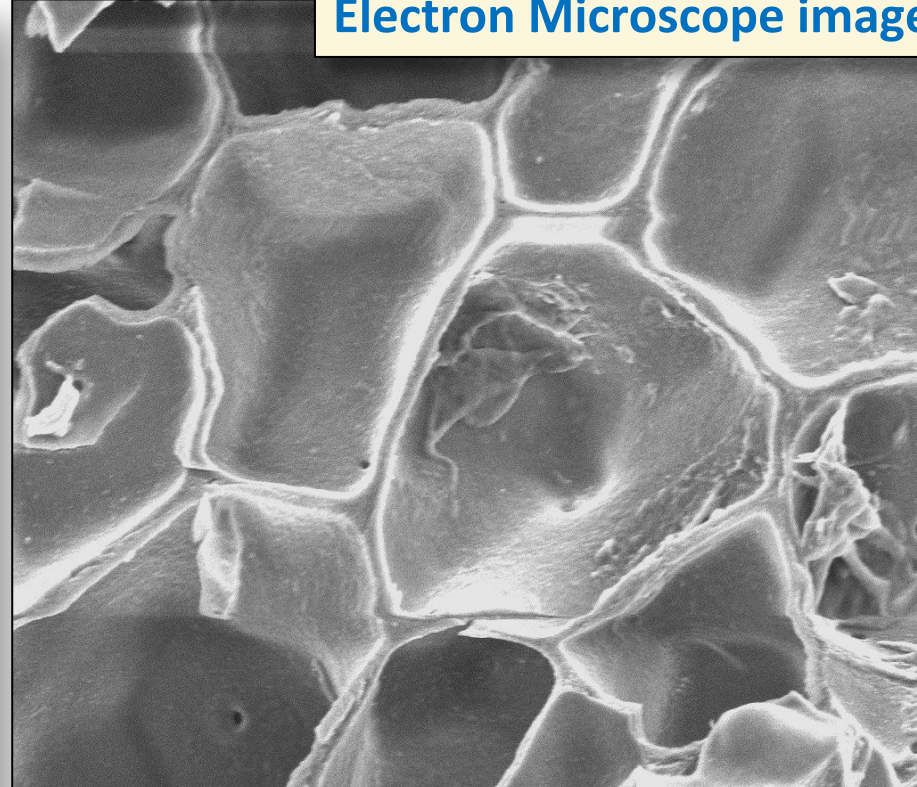
Carbon Spherules: Gas-formed vesicles

Electron Microscope image



E-Beam	Det	Mag	X: 1318.60 μm	FWD	20 μm
5.00 kV	SED	1000 X	Y: -2546.09 μm	6.995	

Electron Microscope image

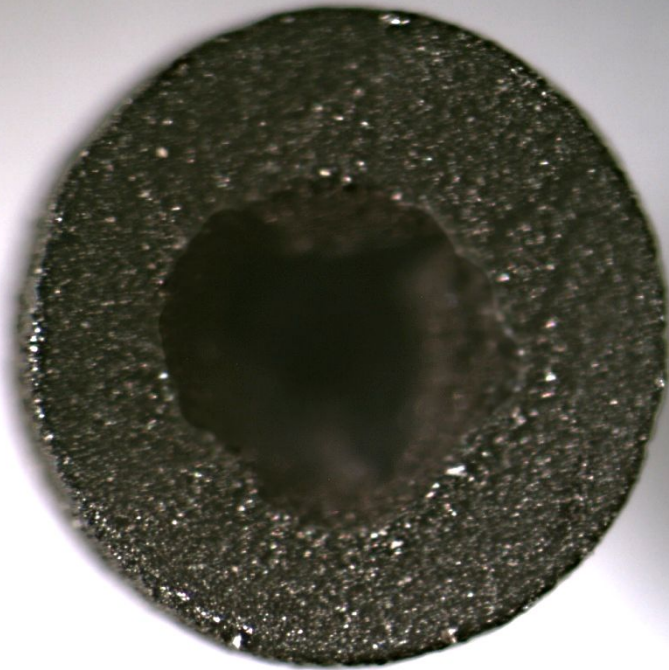


E-Beam	Det	Mag	X: 1421.74 μm	FWD	5 μm
5.00 kV	SED	5.00 kX	Y: -936.81 μm	6.055	

Vesicles, or bubbles, form when gases are released during burning of tree sap

Nanodiamonds in Carbon Spherules

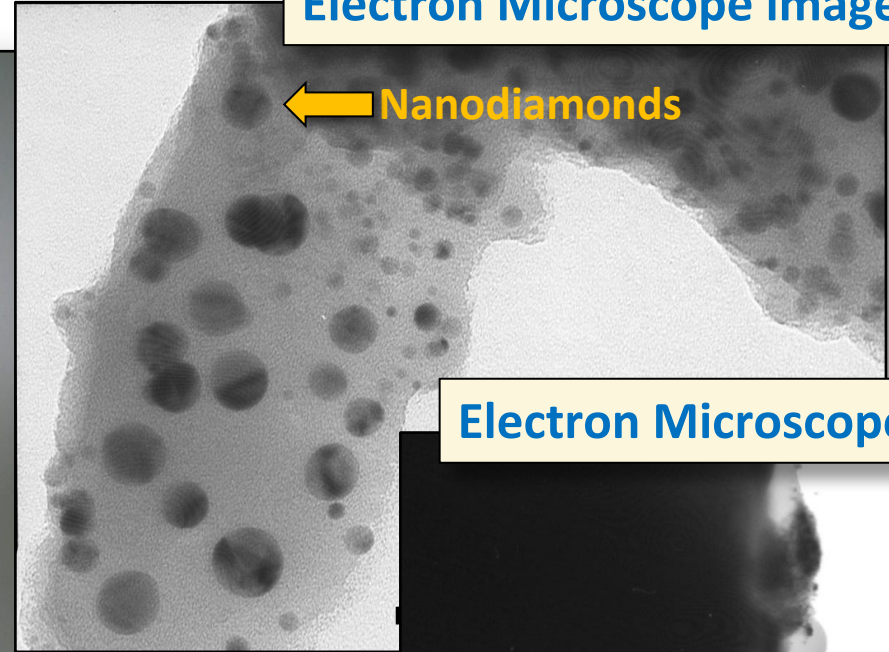
Optical Microscope image



200 μm

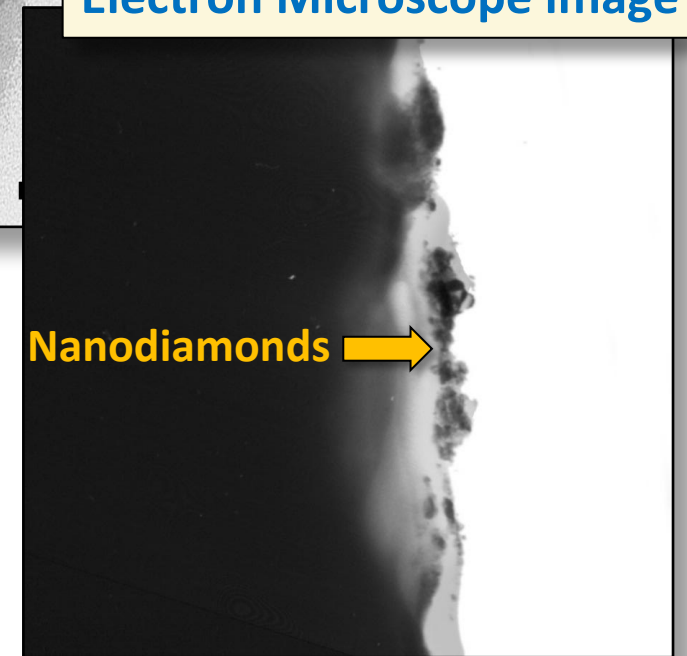
Electron Microscope image

← Nanodiamonds



Electron Microscope image

Nanodiamonds →



Glass-like Carbon (GLC)

Fractures like glass, but made of **carbon**;

Chemistry show it is **charred pine resin**

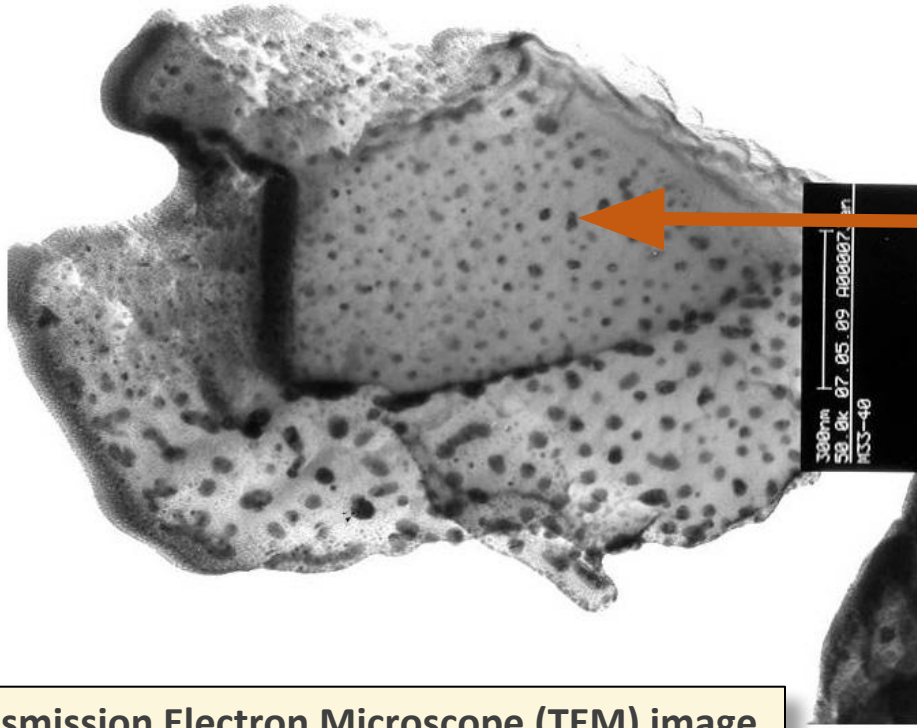


Carbon spherules and **glass-like carbon** are made by intense forest fires during impact



South Carolina

M33-40 Glassy



Transmission Electron Microscope (TEM) image

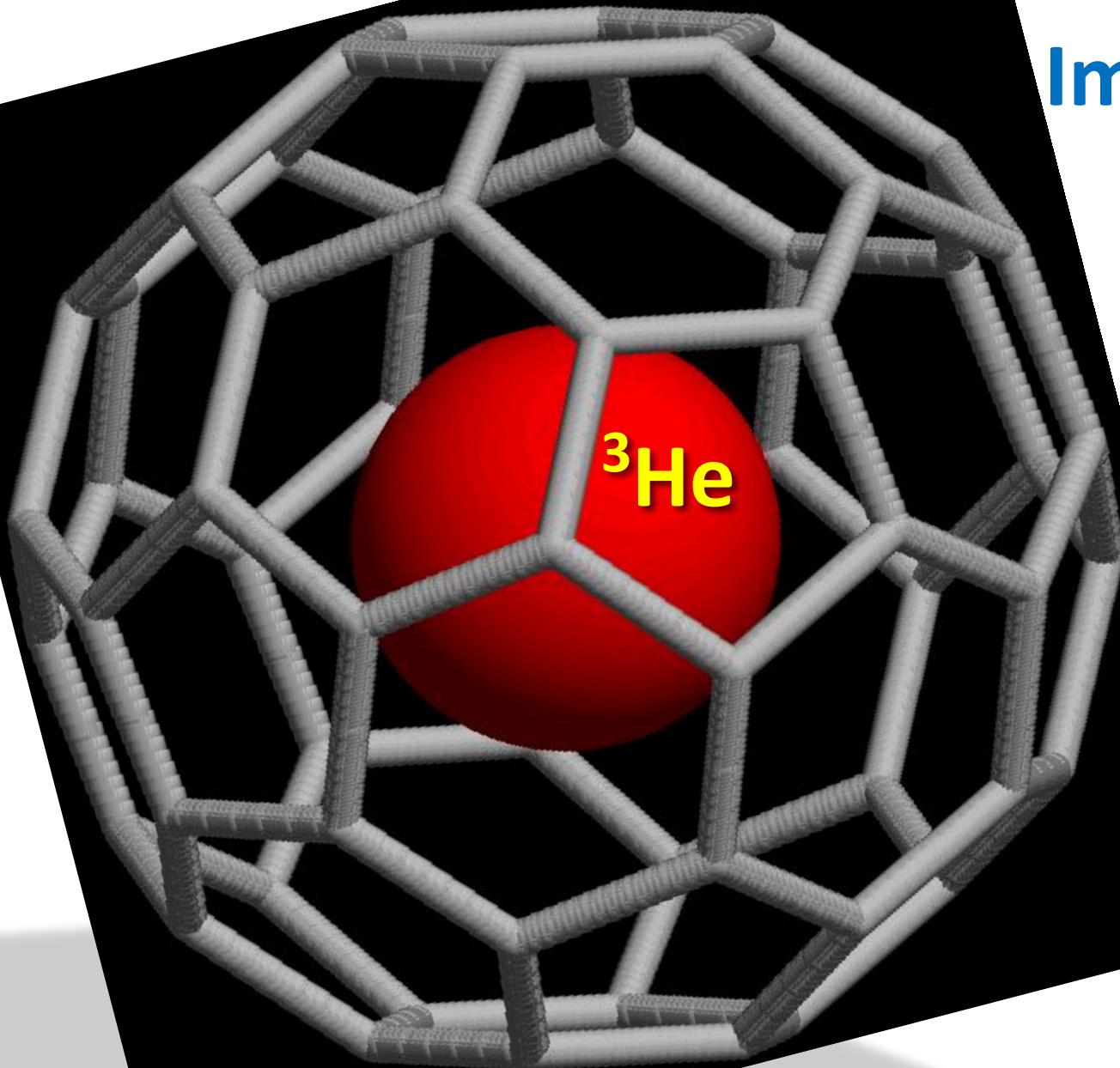
Some YDB
glass-like carbon contains
**millions of
nanodiamonds**
(black dots)

- Size is smaller than cold virus
- 1000 times smaller than human cells or bacteria.

Impact-related Fullerenes

Found in YDB black mats in Arizona, New Mexico, and California

- **Fullerenes** soccer-ball-like cage of carbon atoms; rare on Earth but common in meteorites
- **Helium-3** trapped inside fullerenes; rare on Earth; common in meteorites



Wildfires

As is the case today, 12,800-year-old fires were deadly for wildlife



Credit: McColgan, John, USDA Forest Service