

Wildfires and Products of Burning

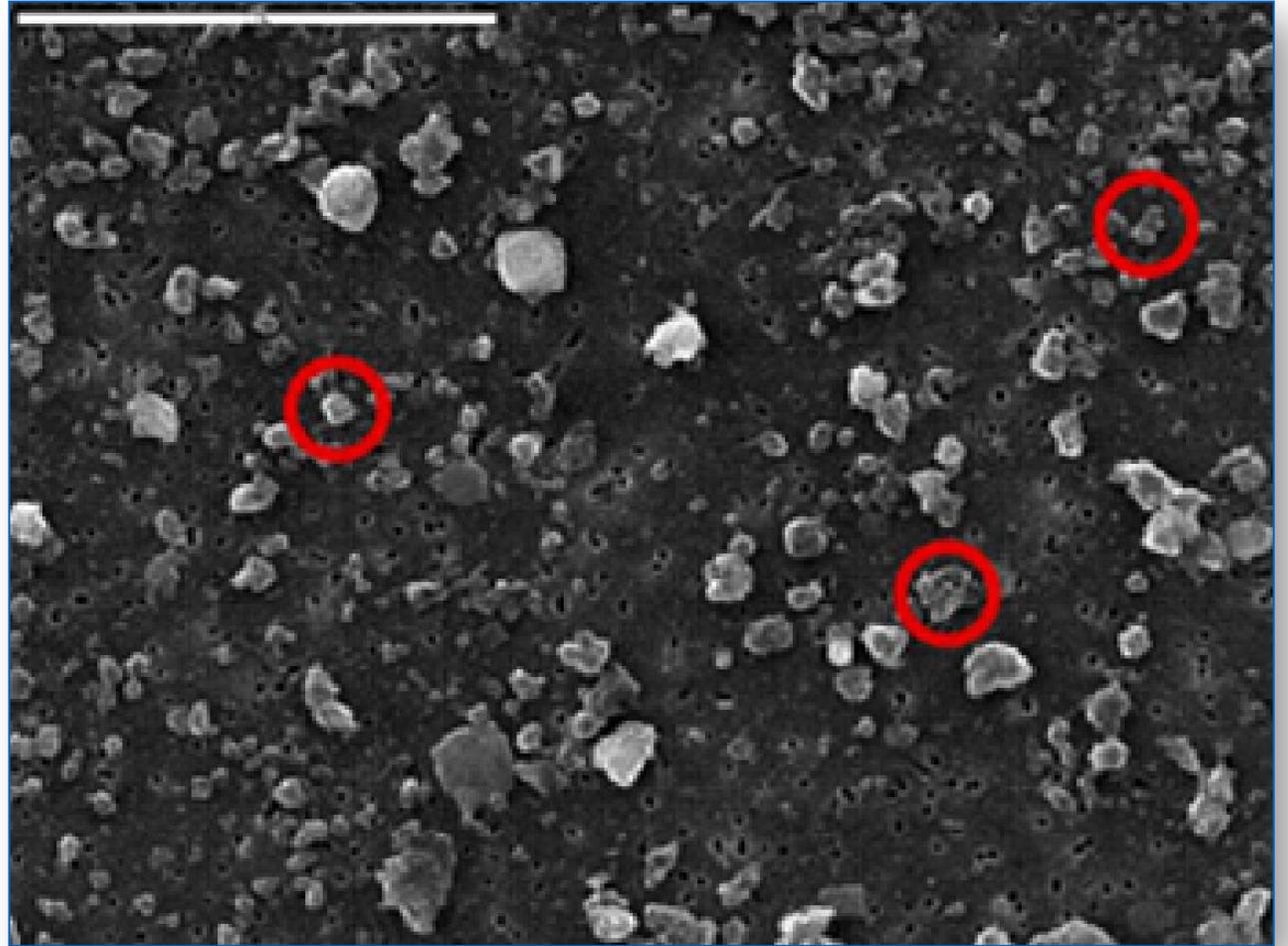
The YDB impact/airburst caused widespread wildfires

- 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

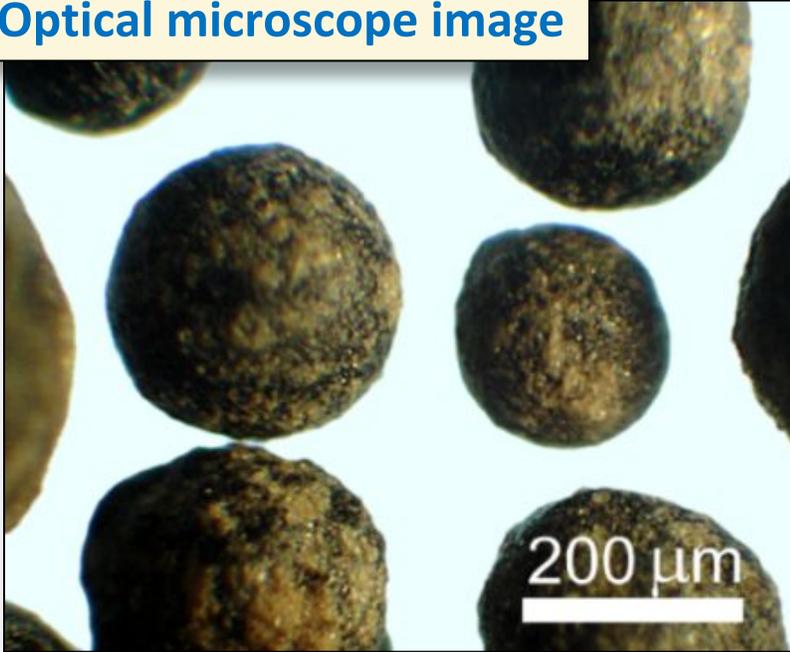
NOTE: this website is a brief, non-technical introduction to the YDB impact hypothesis. For in-depth information, go to “Publications” to find links to detailed scientific papers.

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.



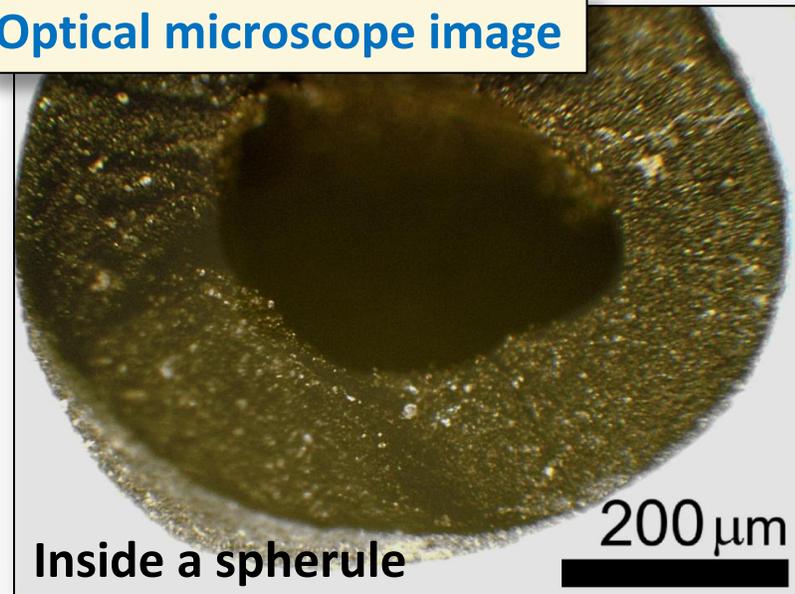
Optical microscope image



Carbon spherules

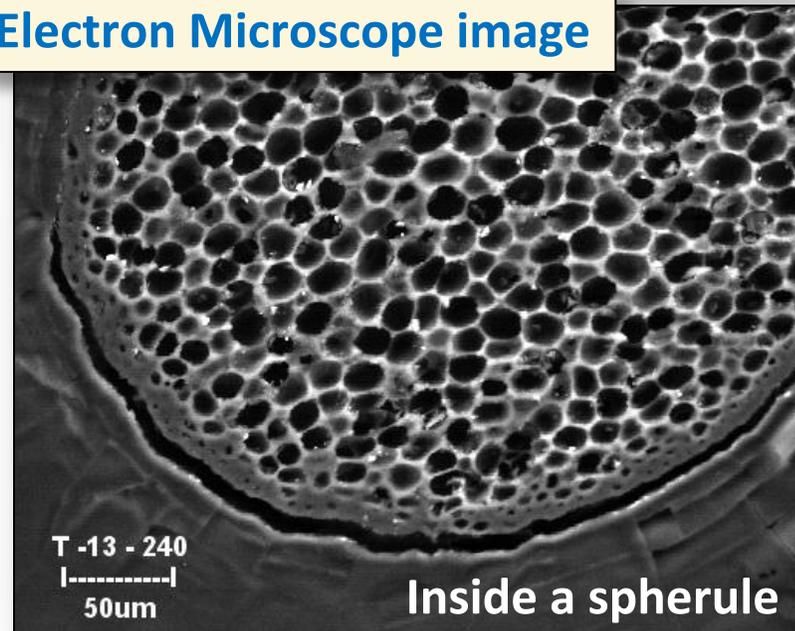
- Mostly carbon
- Size up to 3-4 mm (~1/8")
- Roughly spherical
- Hard shell, sometimes hollow
- Hard, spongy interior

Optical microscope image



Inside a spherule

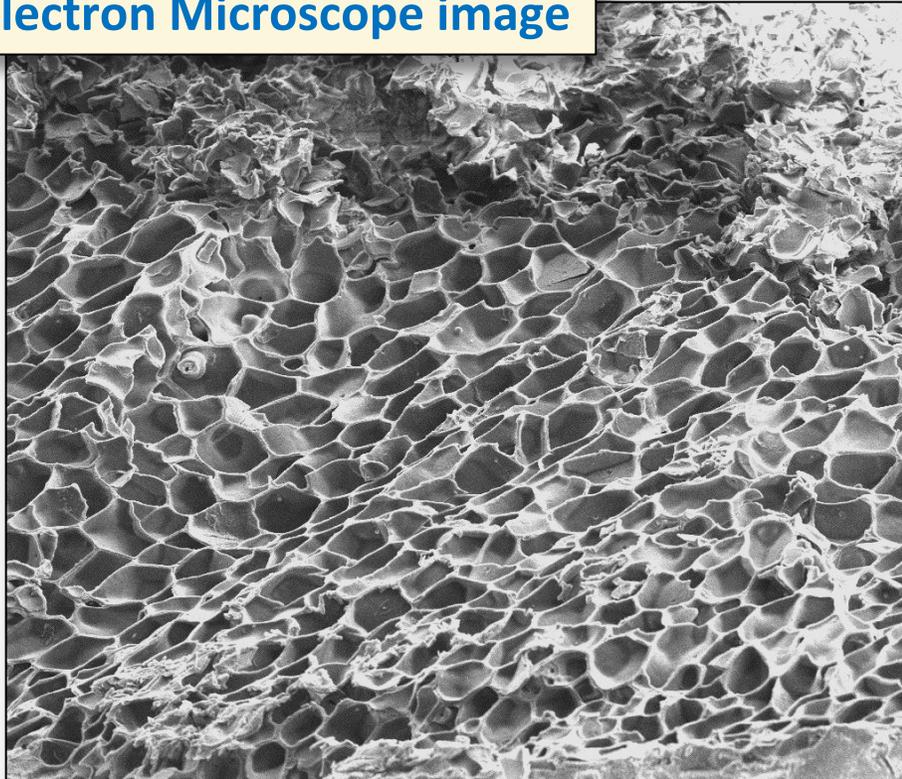
Electron Microscope image



Inside a spherule

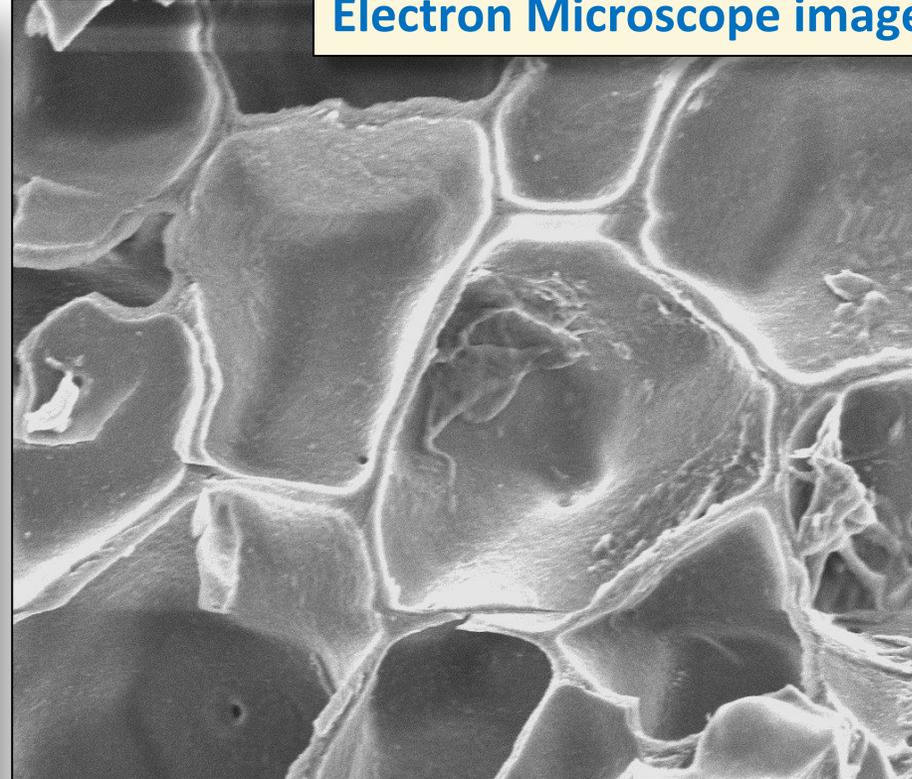
Carbon Spherules: Gas-formed vesicles

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

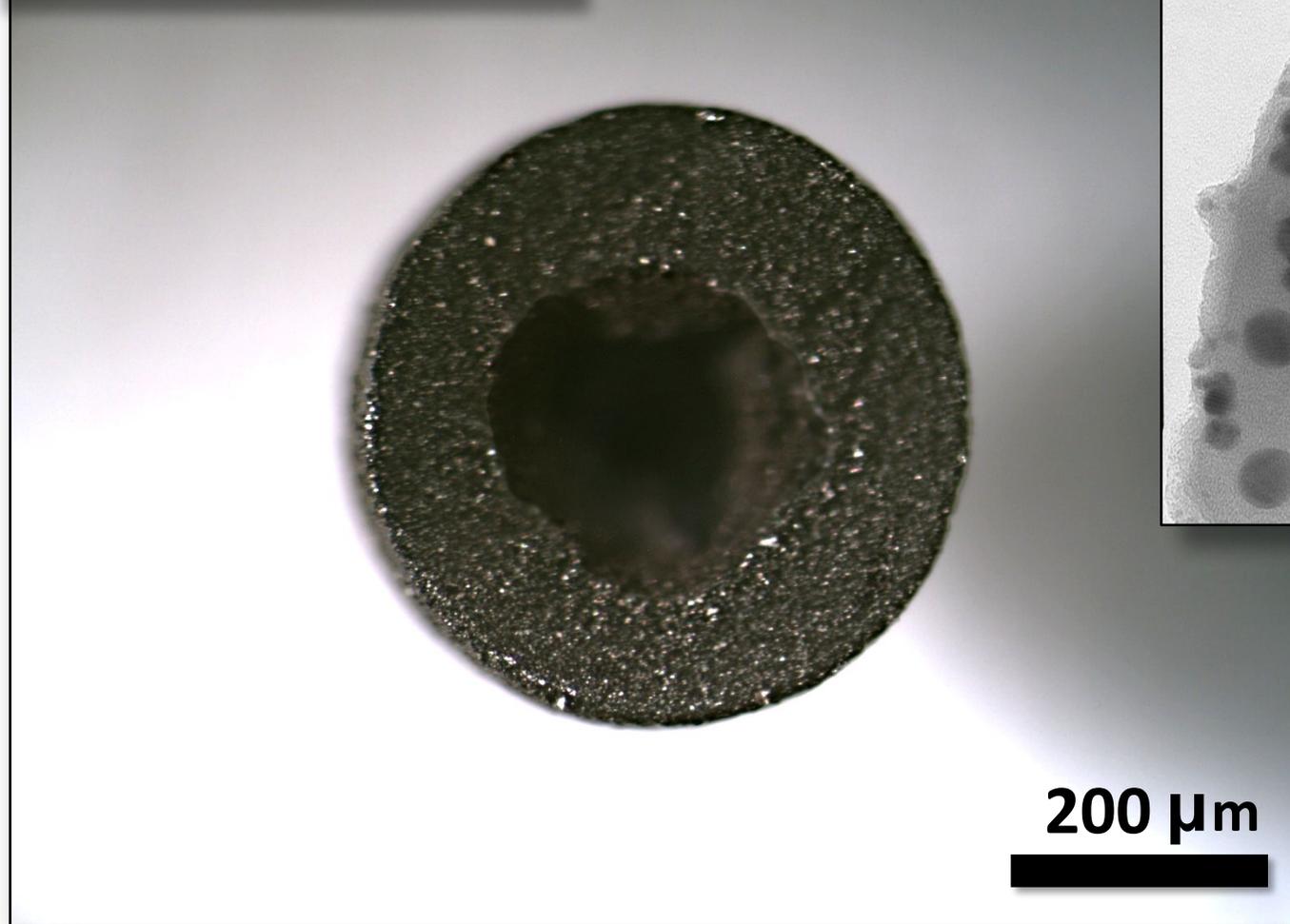


E-Beam	Det	Mag	X: 1421.74 μm	FWD	5 μm
5.00 kV	SED	5.00 kX	Y: -936.81 μm	6.055	

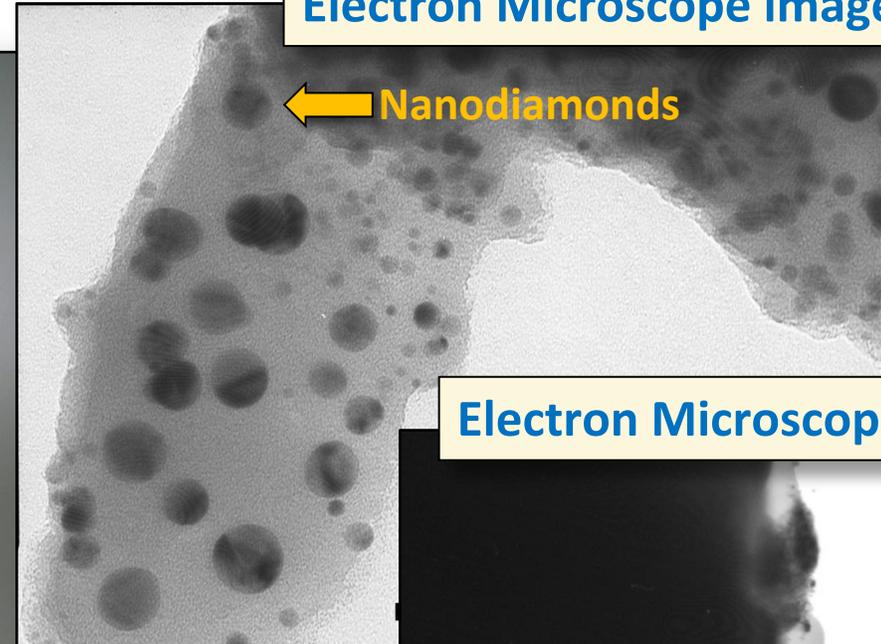
Vesicles, or bubbles, form when gases are released during burning of tree sap

Nanodiamonds in Carbon Spherules

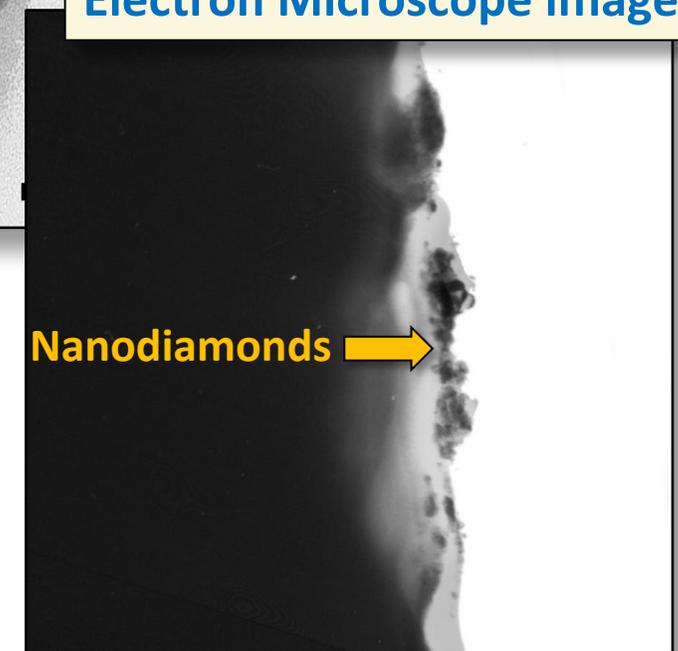
Optical Microscope image



Electron Microscope image



Electron Microscope image



Glass-like Carbon (GLC)

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

Chemistry show it is **charred pine resin**

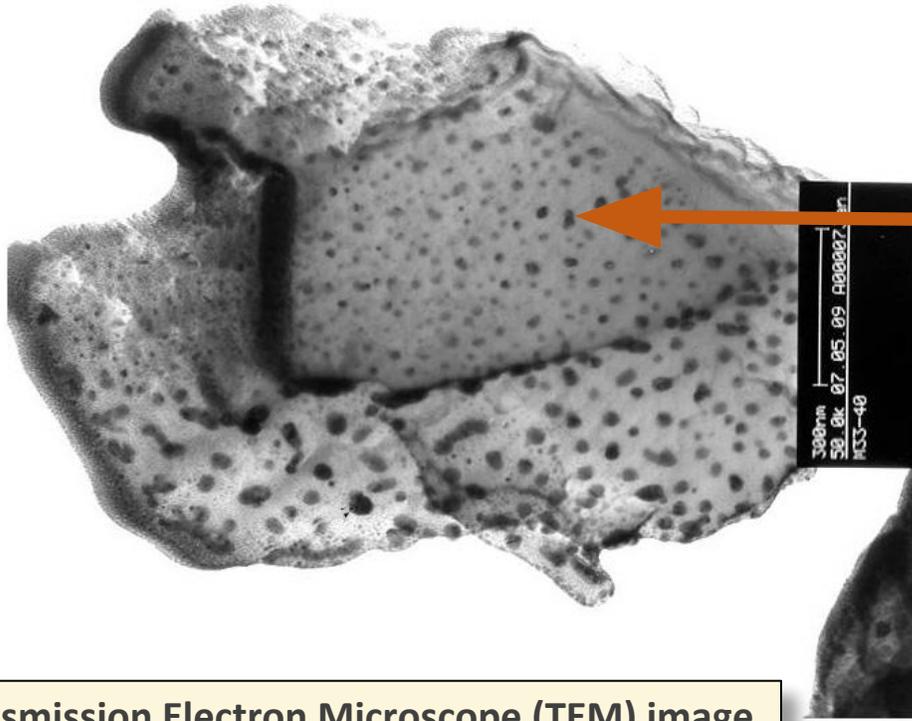


Carbon spherules and **glass-like carbon** are made by intense forest fires during impact



South Carolina

M33-40 Glassy



Transmission Electron Microscope (TEM) image

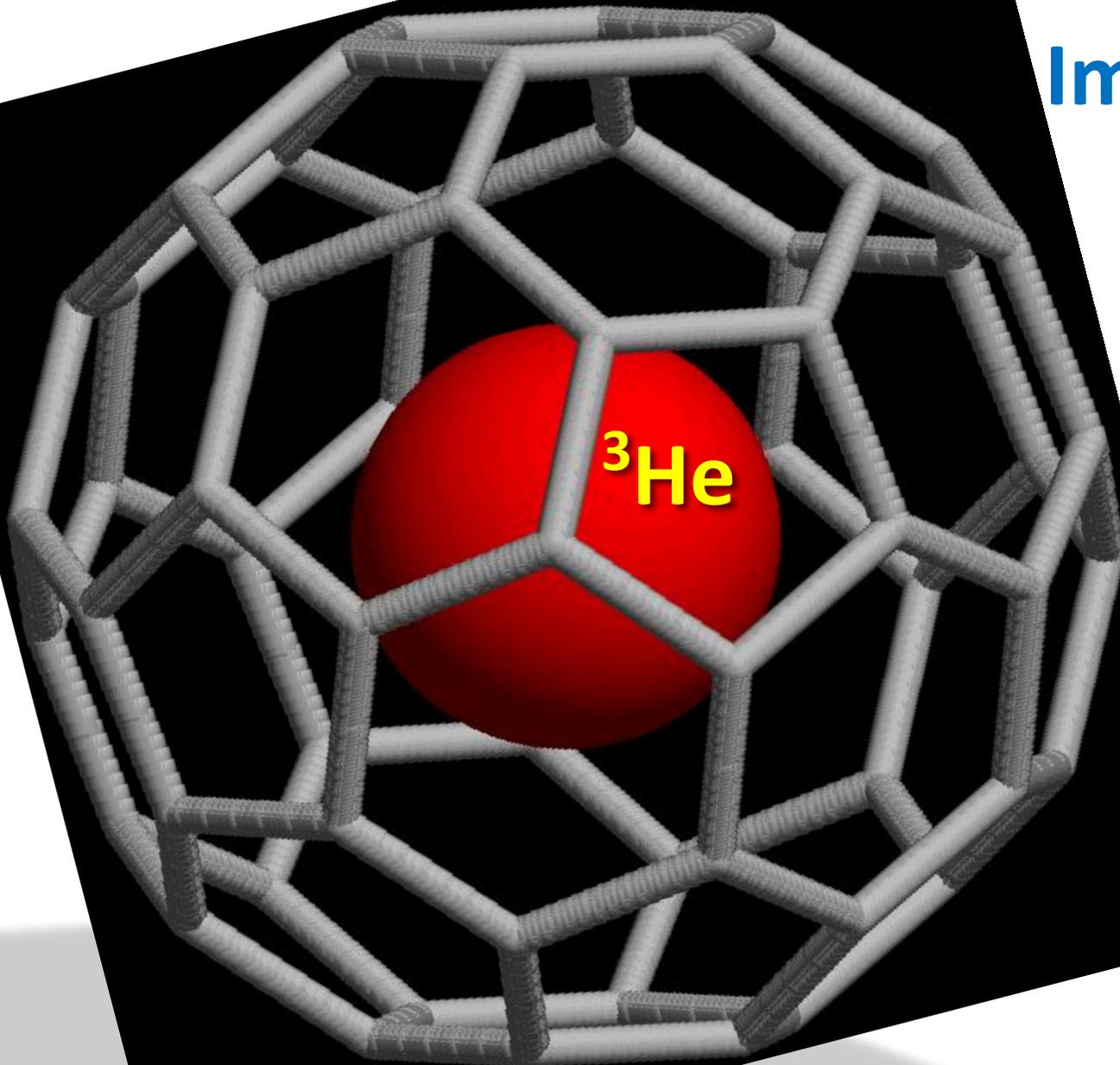
Some YDB
glass-like carbon contains
**millions of
nanodiamonds**
(black dots)

- 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