



Space Radiation

And its effects on our conquerors of the cosmos.

What Is Space Radiation, and why should we care?

- Space radiation Is radiation that is harmful to humans
- Examples of such radiation include X-rays and Gamma Rays
- Space radiation can result in cancers and other genetic diseases

Where does space radiation come from?

- Space radiation comes from sources of high energy, such as stars or supernovas.
- Space radiation comes in multiple forms:
 - Trapped radiation is solar energy trapped in the Magnetosphere of Earth
 - Galactic cosmic radiation is comprised of high density particles traveling at almost the speed of light
 - Solar particle Events, commonly known as solar flares, are results of solar shockwaves releasing radiation

How Does space radiation affect the human body?

- Space radiation can cause long term and short term radiation effects.
- Long term effects of space radiation are caused by Galactic Cosmic Radiation, which can alter gene transcription to cause Cancer and Alzheimer's
- When traveling past the Van Allen Belt, the likelihood of an astronaut to develop fatal cardiovascular disease later in life increases by 43%
- Space Radiation can activate latent infectious microbes in the body and the effect can be seen in days.

Potential Radiation Shields

- Hydrogenated boron nitride nanotubes- use hydrogen
- Methylammonium lead Iodide Perovskite solar cells, which can convert space radiation to electricity
- Deinococcus-Radiation Resistant Prokaryotes
- Kojic Acid

Hydrogenated boron nitride nanotubes

One material in development at NASA has the potential to stop radiation and conserve mass: Hydrogenated boron nitride nanotubes—known as hydrogenated BNNTs—are tiny, nanotubes made of carbon, boron, and nitrogen, with hydrogen interspersed throughout the empty spaces left in between the tubes. Boron is also an excellent absorber of secondary neutrons, making hydrogenated BNNTs an ideal shielding material. Remarkably, researchers have successfully made yarn out of BNNTs, so it's flexible enough to be woven into the fabric of space suits, providing astronauts with significant radiation protection even while they're performing spacewalks in transit or out on the harsh Martian surface. Though hydrogenated BNNTs are still in development and testing, they have the potential to be one of our key structural and shielding materials in spacecraft, habitats, vehicles, and space suits that will be used on Mars.

Methylammonium lead Iodide Perovskite solar cells

This material already used in solar panels can be used in space in a crystalline form to convert space radiation to electricity to aid astronauts during space exploration. Not only would this shield from space radiation, but it would increase the electricity present in a space voyage.

Deinococcus

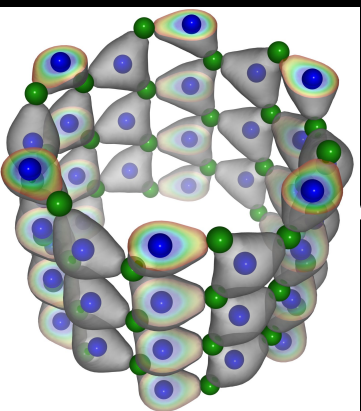
Deinococcus, a prokaryotic species resistant to high levels of ionizing radiation significantly greater than the levels present on Earth, that could have potentially have occurred due to the organism's DNA recoding itself to compensate for any damage of radiation instead of repairing damage. By using these bacteria within MIT's bio clothing, which contains bioreactors within clothing, we could potentially house members of the deinococcus species within clothing so as to shield astronauts from the effects of space radiation within the craft.

My Solution

My solution is a special fabric that has crystalline perovskite solar cells on one side to convert radiation to electricity and Hydrogenated boron nitride nanotube cloth that prevents radiation from affecting the astronaut(s). This fabric could be worn in a space suit to shield the astronaut from radiation and power the suit or could be placed on the outside of the craft to power the craft and shield the astronauts from harm.

Hydrogenated

BNNT



perovskite solar

cells

