AIAA
SHAPING THE FUTURE OF AEROSPACE
AIAA Los Angeles - Las Vegas Section

Sustainable Technologies for Earth++

Brett Cornick, M.S. Materials Science, UCLA '18

Air Purification:
Photocatalytic Oxidation

- TiO_2 can be used to clean air and surfaces when exposed to light.
- Removes VOCs, bacteria, and some viruses
- Currently used by NASA

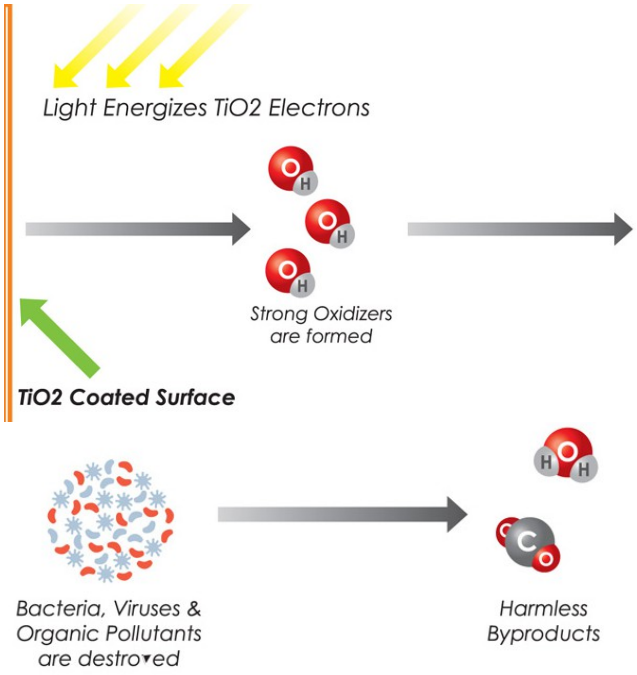

Image:
http://freshaire.com.my/technology/photocatalytic-oxidation/

Energy:
Molten Salt Reactors

- Nuclear energy that does not require cooling water source
- First established in 1950s but abandoned
- Can conceptually be scaled down for use in spacecraft
- Fuel and coolant can be same liquid – loss of coolant means loss of fuel

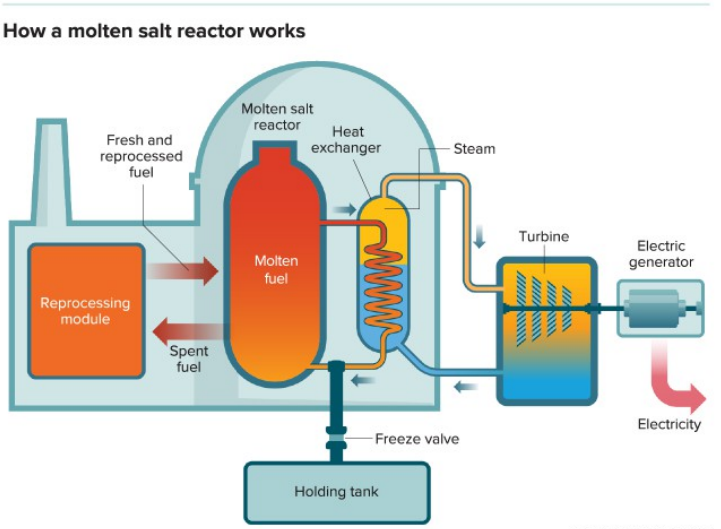

Image:
https://www.discovermagazine.com/environment/nuclear-technology-abandoned-decades-ago-might-give-us-safer-smaller-reactors

Waste Management:
Solid Waste → Cement

- Utilizes ash, reclaimed CO_2, and heat from waste incineration to make cement
- Cementing material can be made of >85% waste ash
- Can be mixed with current soil on foreign planets
- Reduces need for material launch from Earth

Images:
https://en.decorexpro.com/cement/iz-chego-delayut/
https://www.amazon.com/Plasticplace-W95LDBA-Gallon-Garbage-Liners-2-0/dp/B0036F75I6