* Background reading
  + [Material Thermal Degradation Under Reentry Aerodynamic Heating (2014) | Deependran Balakrishnan | 17 Citations](https://typeset.io/papers/material-thermal-degradation-under-reentry-aerodynamic-1ug5gzyv1k)
  + [SDC8-paper210.pdf](https://conference.sdo.esoc.esa.int/proceedings/sdc8/paper/210/SDC8-paper210.pdf)
  + [Re-entry Heat Shields: Materials and Design for Spacecraft Protection - Space Voyage Ventures](https://spacevoyageventures.com/re-entry-heat-shields-materials-and-design/)
  + [Webinar 01312023-Final.pdf](https://ntrs.nasa.gov/api/citations/20230001416/downloads/Webinar%2001312023-Final.pdf)
* List of potential measuring instruments for material degradation
  + Temperature and heat
    - Thermocouple
    - Infrared camera
    - Heat sensors
      * [Heat flux sensors: the latest technologies](https://www.hukseflux.com/library/heat-flux-sensors-latest-technologies)
  + Strain
    - Strain gauge
    - Optical fibre sensors
      * Sources:
        + [Optical Fiber Sensors: Working Principle, Applications, and Limitations - Elsherif - 2022 - Advanced Photonics Research - Wiley Online Library](https://onlinelibrary.wiley.com/doi/full/10.1002/adpr.202100371?msockid=0a55f8df2a8e6e1a0919edfb2bac6f38)
        + [Functional Optical Fiber Sensors Detecting Imperceptible Physical/Chemical Changes for Smart Batteries | Nano-Micro Letters](https://link.springer.com/article/10.1007/s40820-024-01374-9)
        + [Microsoft Word - 01\_Allil\_final.docx](https://cdn.intechopen.com/pdfs/44684/intech-a_guide_to_fiber_bragg_grating_sensors.pdf)
  + Vibrations and sound
    - Vibration sensors
      * Sources:
        + [Efficient Structural Damage Detection with Minimal Input Data: Leveraging Fewer Sensors and Addressing Model Uncertainties](https://www.mdpi.com/2227-7390/12/21/3362)
    - Acoustic emission sensors
      * Sources:
        + [What Is Acoustic Emission Testing? A Definitive Guide - TWI](https://www.twi-global.com/technical-knowledge/faqs/acoustic-emission-testing)
  + Pressure sensors
    - Sources:
      * [Advances in high-performance MEMS pressure sensors: design, fabrication, and packaging | Microsystems & Nanoengineering](https://www.nature.com/articles/s41378-023-00620-1)
  + Recession sensors
    - Measure erosion of a material in extreme environments
    - Commonly used for ablative material testing
    - Sources:
      * [IEEE Aero-Conference Big Sky-10192022.pdf](https://ntrs.nasa.gov/api/citations/20220015212/downloads/IEEE%20Aero-Conference%20Big%20Sky-10192022.pdf)
      * [Webinar 01312023-Final.pdf](https://ntrs.nasa.gov/api/citations/20230001416/downloads/Webinar%2001312023-Final.pdf)
      * [Microsoft PowerPoint - 6thAblationWorkshop\_Winter\_seeding](https://ntrs.nasa.gov/api/citations/20190001960/downloads/20190001960.pdf)
      * [Remote Recession Sensing of Ablative Heat Shield Materials - NASA Technical Reports Server (NTRS)](https://ntrs.nasa.gov/citations/20140011534)