

Risk Assessment for use of Black Silicon

Black Si is a Si wafer that has been partially etched in an RIE system to produce a surface composed of millions of sharp needles of Si, ranging in size from a few 10s of nm to 10s of um, but with a tip radius of 10nm or so (i.e. very sharp). The needles are strongly bonded to the Si surface so won't fall off simply by waving the wafer around in air. But if mechanically scratched, there is a chance the needles may break off and float in the air.

Hazards:

- The “needles” could penetrate the skin. This could result in the needles getting stuck and breaking off in the skin. Anything on the needles, such as solvents, could then enter the bloodstream.
- Breathing in “needles” could result in respiratory system damage.

Risks:

- Risks of black silicon are generally unknown, but potential for other chemicals to enter the bloodstream. As such, the black silicon should be considered as hazardous.
- Scratching of the surface could result in the needles becoming detached from the surface, and lead to harm to the respiratory system.

Precautions:

- Protective gloves should be worn when handling black silicon samples, and care taken not to touch the sharp surface with fingers. Only use tweezers.
- Care should be taken not to scratch the surface, and samples should only be handled in well-ventilated areas.

Training Required:

None

Risks Remaining:

Not known; as such, samples should be treated with care and as hazardous.

Emergency Procedures:

In case of contact with skin, wash immediately with soap and water.

If breathing difficulty arises, immediately seek medical assistance.