

Design Space – What is nanotechnology?

How “nanotech” is it?

What are the hazards of a particular nanotechnological process?

Assembly Method: The most important attribute has to do with how the tool / device is assembled. When one considers the conventional notion of nanotechnology as manipulating objects at the nano scale, the ultimate goal is to manipulate individual atoms. Assembly methods can be measured against this goal by seeing how “bottom up” they are, since top-down approaches don’t start by manipulating nano materials.

Dimensions Controlled: The number of dimensions controlled describe the degree to which the manipulation of nano scale objects has been achieved in any particular process, and is thus a key attribute in placing a process relative to others.

Assembly Precision: Random assembly methods may create end products that constitute nanotechnology, but they clearly do not allow controlled manipulation of nano materials. Deterministic methods allow controlled manipulation, but the degree to which this is achieved may vary. (For example, DNA based assembly, though deterministic, may be considered less precise than AFMs).

Forces/Physical Properties Involved: Since forces and physical properties at the nano scale can be vastly different from those at the macro scale, specifying the forces that various applications rely on can provide additional insight on the degree of precision involved.

Macro-Nano Scale Interface: For nanotechnology to be useful, there must be the ability to harness it to existing macro scale technologies (for purposes here, macro refers to anything larger than nano). It is thus important to understand how the interface is achieved, and whether the technology is limited in performance due to interface constraints. (Possible values: whether interface exists, whether the interface is limiting)

Bio Integration: Nanotechnology is a relatively new field that derives much of its inspiration from biological processes that occur naturally. It thus seems important to describe nanotechnological processes in terms of whether they are bio integrated, and the features of the biological processes that are attractive to simulate artificially.