Unit n °62 Supplement 2

3D printing fantasy

3D printing could enable the possibility to realize taylored multilayer and multifunctional “sandwich” structures with special engineering-oriented characteristics which could open new innovative application fields:

** high-sensitive sensor arrays
** shielding materials against heat, sound, electric and magnetic fields, RF, EMP, …
?radiation?, ?gravity?, …
** protecting materials against fire, cold, high voltage
** absorber and storage materials for gases and moisture [39]
** organic and inorganic catalyst materials [17]
** membrane and sponge materials
** chameleon-like materials [18,19]
** flexible electronics [20,21]
** metamaterials [42], stealth materials
** smart materials [43], ?impact absorber?
** ?Chabe-oven-like materials? [22]
** catapult storage materials for light, energy, … [23,24,25,36]
** materials with special surface structures
    ** transforming turbulent water flow into laminar [26]
    ** reducing flow resistance and aerodynamic drag
    ** absorbing sound [as], light, electromagnetic waves, …

** hydrophilic [34], hydrophobic [35],
biphilic [41] pro/contra icing [41, 38]
** self-cleaning [32], Lotus effect [33], [37],
dirt-repellent
** find more.
The layers consist of
** metal, semiconductor and insulator materials
organic substances (?f.e. Resilin [27],
Chitin [28]?), …
and are geometrically and materially structured
** strips, meandering, checkered, fractal (see
fractal antenna [29]), quasiperiodic [30,31], …
The sandwiches are
** static, energy-free
** dynamic (internal dynamics between the layers)
** free running or externally controlled
** through-plated multilayer structure
** supplied by light, RF, battery [44], …
The design of these sandwiches based on the mathematical tools
** analytic geometry, computational geometry
** partial differential equations, partial difference equations

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