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| QTC (Quantum Tunnelling composite)  What is it?  It’s a flexible polymer that contains tiny metal particles. It can come as a sheet, pill or more recently a printable ink. | What does it do?  A pressure-sensitive material, it is normally an insulator (does not conduct electricity) but if pressure is applied it becomes a conductor (allows electricity to flow) |
| 717489main_8347233104_093f3c4614_o_full_full.jpgPresentation on Quantum Tunneling Composite (QTC)  What is it used for?  High tech clothing (key pads for MP3 players.    Switches used on mobile phones  Games- to control how hard you want to jump or run.  Speed control on machines.  Robotics- touch sensitive fingertips. | Pros  QTC can be made very thin- about the thickness of one human hair- this means it’s very sensitive to pressure. It’s very lightweight. |

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| SMA (Shape memory alloys)  What is it?  An alloy (mix of two or more metals)  Image result for SMA alloys | | What does it do?  When bent out of shape, can be heated above a certain temperature it will return to its original shape.  Smart Alloy Nitinol showing Deformation |
| alloy stent | http://ruthtrumpold.id.au/blogs/designtech/wp-content/uploads/2012/01/bendable_glasses1.jpgImage result for shape memory alloy glasses  What is it used for?  Spectacle frames- when damaged (say bent) can be heated and return to normal shape.  When cool SMA tubes are compact- they can be placed into an artery in the body, when the tube reaches body temperature it will expand allowing blood to flow through the artery.  Dental braces- SMA maintain their shape since they are at a constant temperature   |  | | --- | |  |   Dental braces- SMA maintain their shape since they are at a constant temperature. | Pro’s  The material can “remember” two distinct shapes, a high temperature shape and a low temperature shape.  Image result for temperature |
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| Polymorph  What is it?  Small pellets which fuse together when heated to 62˚C. | | What does it do?  It is a tough material yet becomes easily mouldable at 62°C. Unused pellets can be re-heated and re-used. |
| http://www.karacaortopedi.com.tr/ss/rsmlr/urundetay/resim312.jpg | Image result for Orthopaedic aids  polymorph | Pro’s  Once cooled, polymorph has the advantage of hardening like a plastic, whereas Plasticine remains soft. Polymorph can be re-heated to create new shapes, allowing the user to form the plastic by hand into unique shapes. |
| What is it used for?  Create prototypes and solve manufacturing problems.  Vacuum forming moulds  Manufacturing awkward shapes such as ergonomic handles in prototyping.  Orthopaedic aids | |
| Biometrics  What is it?  Used in computer science as a form of identification and access control. | | What does it do?  Biometrics identifies an individual from a physical characteristic, for example fingerprint, face recognition, iris recognition.  Image result for dna  Image result for fingerprint  Image result for iris in eye |
| Image result for biometrics | Image result for biometrics | Pro’s  Since biometric identifiers are unique to individuals, they are more reliable. |
| What is it used for?   * Airport security. Iris recognition has been used in a number of large airports for several years. . * Schools-fingerprint for school dinners * Mobile phone- I phone fingerprint recognition. * Voice recognition in cars. | |
| Microencapsulation  What is it?  Tiny microscopic bubbles filled with a substance (for example anti-bacterial) that are sprayed onto the material. | | What does it do?  When they come into contact with skin, they burst and slowly release the substance.  http://mikrocaps.com/wp-content/uploads/2012/03/microencapsulated-paraffin.jpg |
| What are they used for?  http://www.filspec.com/images/categories/medical.jpg  Demasox for Diabetic foot treatment  Anti-bacterial socks, underwear and bandages to name a few. | | Pro’s  They can be filled with a number of different substances  For example:   * Fragrances (perfume) * Moisturisers * Insect replant * Vitamins * Anti-bacteria substance. |

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| Photochromic dyes    What is it?  It is a smart dye that can be added to plastics and fabrics. | What does it do?  Photo chromatic dyes **change colour** in response to UV light/sunlight.  Related image |
| Image result for uses of photochromic materialsWhat are they used for?  Image result for photochromic clothing  Decoration purposes on clothes.  Exposure to sunlight causes the lens of the glasses to darken to protect the eye. | Pro’s  Glasses- They provide greater comfort, since they reduce eyestrain and glare in the sun and provide daily protection against harmful UV rays, by absorbing  them.  Clothing- Fun and unique decoration that will appeal to some people as they can change, depending on sun exposure. |

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| Thermochromic dyes. dyes    What is it?  It is a smart dye that can be added to plastics and fabrics. | What does it do?  Thermochromic dyes **change colour** in response to changes in temperature  http://a2.mzstatic.com/us/r30/Purple/v4/d8/a7/1a/d8a71ad4-9e39-a0f0-b2b3-fdc2aaa15938/icon256.png |
| Image result for thermochromic head stripWhat are they used for?  Thermochromic dyes: Smart textiles: Heat Reactive Jacket by Stone Island, a tracksuit top which changes colour from black to green/ blue once it has reached 27 degrees. The fabric that is cotton nylon with thermosentive liquid crystals that react to heat.  Novelty fashion  The wearer’s body temperature provides heat to change the colour of the jacket. (Stone Island brand)  Thermometer strips, baby grows. | Pro’s  Clothing- Fun and unique decoration that will appeal to some people as they can change, depending on body temperature.  Other- Can be used to visually show if something is too warm or too cold (baby feeding spoons, baby grows, packaging on food/drink products) |