

CLAIMS

1. Use of at least 0.1 wt%, more preferably at least 0.5 wt%, even more preferably at least 1 wt%, even more preferably at least 2 wt%, most preferably at least 3 wt.%, preferably 2 – 60 wt.%, more preferably 3– 50 wt%, more preferably 5 – 45 wt% of a porous, chemically interconnected, carbon-nanofibers-comprising carbon networks for reinforcing a thermoset material, said weight based on the total weight of the reinforced thermoset material.
2. Use according to claim 1, wherein the reinforced thermoset material comprises additional reinforcing agent(s), wherein the total amount of carbon networks and the additional reinforcing agent(s) is between 1 and 75 wt%, more preferably between 10 and 45 wt% of the total weight of the reinforced thermoset material.
3. Use according to claim 1 or 2, wherein the amount of additional reinforcing agent(s) is between 1 and 45 wt%, preferably between 5 and 40 wt%, more preferably between 10 and 35 wt%, most preferably between 15 and 30 wt%, based on the total weight of the reinforced thermoset material.
4. Use according to any one of the preceding claims wherein the amount of said carbon network is between 5 and 60 wt%, preferably below 45 wt%, even more preferably below 35%.
5. Use according to any one of claims 2 – 4, wherein the further reinforcing agent comprises carbon fibers, glass fibers, aramids, natural fibers, carbon nanotubes, carbon nanofibers, silicon nanotubes, nanoclays.
6. Use according to any one of the preceding claims, for improving one or more of the following properties of the thermoset material:
 - (k) the electrical conductivity of the thermoset material;
 - (l) the glass transition temperature of the thermoset material;
 - (m) the stiffness of the thermoset material;
 - (n) the tensile strength of the thermoset material;
 - (o) the shear strength of the thermoset material;
 - (p) the compressive strength of the thermoset material;
 - (q) the impact strength of the thermoset material;
 - (r) the durability of the thermoset material;
 - (s) the fatigue resistance of the thermoset material; and/or
 - (t) the thermal conductivity of the thermoset material.

7. A reinforced thermoset material comprising at least 0.1 wt%, more preferably at least 0.5 wt%, even more preferably at least 1 wt%, even more preferably at least 2 wt%, most preferably at least 3 wt.%, preferably 2 – 60 wt.%, more preferably 3 – 50 wt%, more preferably 5 – 45 wt% of a porous, chemically interconnected, carbon-nanofiber-comprising carbon network.
8. The reinforced thermoset material according to claim 7, comprising additional reinforcing agent(s), wherein the total amount of carbon networks and reinforcing agent(s) other than said carbon networks is between 1 and 75 wt%, more preferably between 10 and 45 wt% of the total weight of the reinforced thermoset material.
9. The reinforced thermoset material according to claim 7 or 8, wherein the amount of further reinforcing agent is between 1 and 45 wt%, preferably between 5 and 40 wt%, more preferably between 10 and 35 wt%, most preferably between 15 and 30 wt%, based on the total weight of the reinforced thermoset material.
10. The use according to any one of claims 1-6 or the reinforced thermoset material according to any one of claims 7 - 9, wherein the carbon network comprises crystalline carbon-nanofibers.
11. Use according to any one of claims 1-6 or 10 or the reinforced thermoset material according to any one of claims 7 - 10, wherein the carbon network is an intraparticle porous network.
12. Use according to any one of claims 1-6 or 10-11 or the reinforced thermoset material according to any one of claims 7-11, wherein the average fiber length of the carbon-nanofibers is 30- 10,000 nm.
13. Use according to any one of claims 1-6 or 10-12 or the reinforced thermoset material according to any one of claims 7-12, wherein the thermoset material is any one of unsaturated polyester resin, vinyl ester resin, epoxy, phenolic, urethane, polydicyclopentadiene, cyanate esters (CEs), bismaleimides (BMIs), silicones, melamine formaldehyde, phenol formaldehyde, urea formaldehyde, diallyl phthalate, benzoxazines, polyimides, furan resins, or polyamides.
14. Use according to any one of claims 1-6 or 10-13 or the reinforced thermoset material according to any one of claims 7-13, wherein the carbon networks are obtainable by a process for producing crystalline carbon networks in a reactor **3** which contains a reaction zone **3b** and a termination zone **3c**, by injecting a water-in-oil or bicontinuous micro-emulsion **c** comprising metal catalyst nanoparticles, into the reaction zone **3b** which is at a temperature of above 600 °C, preferably above 700 °C, more preferably above 900 °C, even more preferably above 1000 °C, more preferably above 1100 °C, preferably up to 3000 °C, more preferably up to 2500 °C, most preferably up to 2000 °C, to produce crystalline carbon networks **e**, transferring these networks **e** to the termination zone **3c**, and

quenching or stopping the formation of crystalline carbon networks in the termination zone by spraying in water d.

- 5 15. An article of manufacture comprising the reinforced thermoset material according to any one of claims 7-14, said article for example being a coating, an adhesive, a reinforcing element, a heating element, automotive part or a construction element, or a lightweight reinforced radiator for wind turbines and airplane.
- 10 16. Use, article or reinforced thermoset material according to any one of the preceding claims, wherein the carbon network is an intraparticle porous network wherein the carbon nanofibers are interconnected to other carbon nanofibers in the network by chemical bonds via junctions, wherein the pores in the network have an intraparticle pore diameter size of 5-150 nm using Mercury Intrusion Porosimetry according to ASTM D4404-10, wherein at least 20 wt% of the carbon in the carbon networks is in crystalline form, and the carbon nanofibers have an average aspect ratio of fibre length-
- 15 to-thickness of at least 2.