|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Bionic prototype | Materials | Method | Multifunction | Wettability | Res |
| Mosquito  compound eye | glass, photoresist, PDMS, SiO2, fluoroalkylsilane(FAS) | Soft lithography,  Vapor-phase assembly | AF, AR  Self-cleaning | Superhydrophobic | 1 |
| Mosquito  compound eye | silica glass, PMMA  hydrofluoric acid(HF) | femtosecond laser  wet etching | AR, Large FOV  Fast motion detection |  | 2 |
| Mosquito  compound eye | TEOS, SiO2,KH-602  acetone, aqueous ammonia | self-assembly,  multiple spinning | AF, AR, De-wetting  Self-cleaning | Superhydrophobic | 3 |
| Mosquito  compound eye | silica glass, 1H, 1H, 2H, 2H-perfluorodecyltriethoxysilane | laser microfabrication | AF, Self-cleaning  Anti-icing | Superhydrophobic  Low sliding-off angle | 4 |
| Fly  compound eye | glass, ZnAc2·2H2O,  HMTA, EG, surfactant | self-assembly,  spinning coating | AF, Self-cleaning  Anti-freezing | Superhydrophobic  Low sliding-off angle | 5 |
| Fly  compound eye | K9-glass, PDMS, HF,  silicone oil, fluorine-free n-decyltrichlorosilane | femtosecond laser wet etching, soft lithography, PDMS swelling | AF, Self-cleaning,  Large FOV | Superhydrophobic | 6 |
| Moth  compound eye | Ag, PS, Silicon, HF, H2O2 | metal catalytic wet etching,  reactive ion etching(RIE) | AR, Water-repellent | Superhydrophobic | 7 |
| Moth  compound eye | POSS, 1,6-hexanediol diacrylate, Ni mold, polycarbonate | nanoimprint lithography (NIL) | AR, salinity and acid resistant |  | 8 |
| Moth  compound eye | NaOH, PS, St, KPS, EG, NASS, PDMS, NOA63 | oxygen plasma,  Langmuir Blodgett deposition, UV-NIL | AR, Self-cleaning | Superhydrophobic | 9 |
| Butterfly  wing | TEOS, HCl, pretreated butterfly wings, nitric acid, perchloric acid | biotemplate-assisted,  sol-gel | AF, AR  Structural color | Superhydrophilic | 10 |
| Butterfly  wing | PDMS, Zn(Ac)2·2H2O, monoethanolamine, ethylene glycol monomethyl ether, Zn(NO3)2·6H2O | soft lithography,  crystal growth | AF, Self-cleaning  Droplet directional migration | Superhydrophobic | 11 |
| Cicada  wing | AAO, PDMS, PS,  phosphoric acid (H3PO4) | dynamic injection molding  bionic gradient template | AF, Antibacterial  AR, Self-cleaning | Superhydrophobic | 12 |
| Cicada  wing | YCl3, YbCl3, ErCl3, Au, TEOS ammonium fluoride, Cicada Wings, Crystalline silicon | thermal decomposition process, sputtering | Fluorescence enhancement, AR |  | 13 |
| Cicada  wing | polystyrene, poly(ethylene glycol) (12) tridecyl ether, | Glancing Angle Deposition (GLAD), oxygen plasma etching | Antibacterial | Superhydrophobic | 14 |
| Dragonfly  wing | Titanium, KOH, acetone | hydrothermal etching | Antibacterial,  Cellular compatibility | hydrophilic | 15 |
| Dragonfly  wing | PDMS, Zn(NO3)2·6H2O,  HAuCl4·4H2O, HMTA, NaOH | Hydrothermal  photo-reduction | Antibacterial  Antifouling | Superhydrophobic  Low sliding-off angle | 16 |
| Dragonfly  wing | PP, C4F8, ethyl alcohol | oxygen–plasma treatment,  fluorocarbon polymer deposition | AF, Antiwetting | Superhydrophobic | 17 |
| Gecko  Skin | gecko skin moults, polystyrene, Pine needle oil,  hexane, xylene, NaOH, FMC | bio-template | Self-cleaning Antibacterial  Antiwetting | Superhydrophobic | 18 |
| Shark  skin | PDMS, FMA, KH550, α-bromoisobutyryl bromide,  Silica particles | replica molding | Anti-drag,  Self-cleaning  Self-healing | Superhydrophobic | 19 |
| Shark  skin | PDMS, multiwalled carbon nanotubes (MWCNTs) | roll-coating | Anti-drag,  Self-cleaning | Superhydrophobic | 20 |
| Beetle | Al sheets, FAS, chained nano-SiO2 sol, anhydrous ethanol,  TEOS, SiC particles | spray | water collection, AF | Superhydrophobic | 21 |
| Beetle | PTEE, copper mesh | femtosecond laser | water collection | Interlaced wettability | 20 |
| Lotus  leaf | PDMS, HFS, hexane,  Silicone oil | dip-coating | AF, Self-cleaning | Superhydrophobic | 22 |
| Lotus  leaf | tetrabutyl titanate(TBT), ethanol, glycerol, 1H,1H,2H,2H-perfluorooctyltrichlorosilane | Solvothermal,  self-assembly | anti-icing,  Self-cleaning | Superamphiphobic | 23 |
| Trifolium repens L.  leaf | aluminum alloy, 1H,1H,2H,2H-perfluorodecyltriethoxysilane | femtosecond laser  boiling water treatment | anti-icing  anti-frost  self-cleaning | Superhydrophobic | 24 |
| Euphorbia myrsinites leaf | silicon wafer, photoresist hexamethyldisilazane, Au,  SiO2, fluorocarbon | reactive ion etching (RIE) | AF, Self-cleaning  heat exchange | Superhydrophobic | 25 |
| Phyllostachys viridis leaf | copper plate, myristic acid | femtosecond laser  chemical etching | AF, Anti-icing | Superhydrophobic | 26 |
| Rice  leaf | SF6, C4F8, O2, black silicon,  trimethylchlorosilane,  Krytox 101/PDMS | RIE, spin coating  oxygen–plasma treatment | Anisotropic wetting  fog collection  directional transport | Hydrophilic | 27 |
| Snail shell | PDMS, Epoxy (EP) resin  Snail shells | bio-template | Self-cleaning,  antifouling | Switchable wettability | 28 |
| Water strider  leg | Al sheets, 1H, 1H, 2H, 2H-perfluorodecyltriethoxysilane (PFDTES) | femtosecond laser | Self-propelled actuator | Gradients wettability | 29 |

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