Claims

1. A device for solid phase microextraction (SPME) comprising

a plastic substrate,

a pre-coating layer on the plastic substrate, wherein the pre-coating layer comprises polyacrylonitrile (PAN) and

a SPME coating on the pre-coating layer.

2. The device of claim 1 wherein the plastic substrate is selected from the group consisting of polyolefins, polyamides, polycarbonate, polyester, polyurethanes, polyvinyl chloride, polytetrafluoroethylene (PTFE), polyetheretherketone (PEEK), polysulfone, and polyterephthalate.

3. The device of either of claims 1 or 2 wherein the plastic substrate is selected from the group consisting of polypropylene and polyethylene.

4. The device of any of claims 1-3 wherein the SPME coating comprises

a binder selected from the group consisting of polyacrylonitrile (PAN), polyethylene glycol (PEG), polypyrrole, derivatized cellulose, polysulfone, polyacrylamide, polyamide, polydimethylsiloxane (PDMS), polyacrylate, polytetrafluoroethylene (PTFE), and polyaniline, and

a sorbent selected from the group consisting of functionalized silica, carbon, polymeric resins and combinations thereof.

5. The device of claim 4 wherein the sorbent is selected from the group consisting of C18 silica, C8 silica, mixed-mode functionalized silica, HLB resins, divinylbenzene resins, styrene resins, poly(styrene-co-divinylbenzene) resins and combination thereof.

6. The device of any of claims 1-5, wherein the plastic substrate comprises a pin or a plurality of pins.

7. The device of claim 6, wherein the pin or pins are solid.

8. The devices of any of claims 1-7, wherein

the plastic substrate has a first surface energy,

the SPME coating has a second surface energy that is higher than the surface energy of the plastic substrate,

wherein the precoating layer adheres strongly to the plastic substrate, and

wherein the SPME coating adheres strongly to the precoating layer.

9. A method for improving the adhesion of an SPME coating on a plastic substrate, the method comprising the steps

providing a plastic substrate,

coating the substrate with a precoat to provide a precoated substrate, and

coating the precoated substrate with an SPME coating,

wherein the precoat comprises polyacrylonitrile, and

wherein the SPME coating adheres to the precoated substrate better than it adheres to the untreated plastic substrate.

10. The method of claim 9 wherein the plastic substrate is selected from the group consisting of polyolefins, polyamides, polycarbonate, polyester, polyurethanes, polyvinyl chloride, polytetrafluoroethylene (PTFE), polyetheretherketone (PEEK), polysulfone and polyterephthalate.

11. The method of either of claims 9 or 10 wherein the SPME coating comprises a binder and a sorbent, wherein

the binder is selected from the group consisting of polyacrylonitrile (PAN), polyethylene glycol (PEG), polypyrrole, derivatized cellulose, polysulfone,

polyacrylamide, polyamide, polydimethylsiloxane (PDMS), polyacrylate, polytetrafluoroethylene (PTFE), and polyaniline, and

the sorbent is selected from the group consisting of functionalized silica, carbon, polymeric resins and combinations thereof.

12. The method of claim 11, wherein the binder is PAN and the sorbent is C18 functionalized silica.