

In an aspect the present invention provides a method of fabricating a printhead having a hydrophobic ink ejection face, the method comprising the steps of:

- (a) providing a partially-fabricated printhead comprising a plurality of nozzle chambers filled with sacrificial material and a relatively hydrophilic nozzle surface, said nozzle surface at least partially defining the ink ejection face;
- (b) depositing a layer of relatively hydrophobic polymeric material onto the nozzle surface;
- (c) defining a plurality of nozzle openings in said nozzle surface by the sub-steps of:
 - (c1) depositing a photoresist mask on said polymeric material;
 - (c2) patterning said photoresist mask so as to unmask said polymeric material in a plurality of nozzle opening regions;
 - (c3) etching said unmasked polymeric material and said underlying nozzle surface to define the plurality of nozzle openings; and
- (d) removing said sacrificial material and said photoresist mask by ashing in an oxidative plasma, said polymeric material being resistant to removal by said oxidative plasma, thereby providing a printhead having a relatively hydrophobic ink ejection face, wherein said polymeric material is a polymerized siloxane.

In an ~~embodiment-first aspect~~ the present invention provides a method of fabricating a printhead having a hydrophobic ink ejection face, the method comprising the steps of:

- (a) providing a partially-fabricated printhead comprising a plurality of nozzle chambers and a relatively hydrophilic nozzle surface, said nozzle surface at least partially defining the ink ejection face;
- (b) depositing a layer of relatively hydrophobic polymeric material onto the nozzle surface, said polymeric material being resistant to removal by ashing; and
- (c) defining a plurality of nozzle openings in said nozzle surface, thereby providing a printhead having a relatively hydrophobic ink ejection face, wherein steps (b) and (c) are performed in any order.

Optionally, step (c) is performed prior to step (b), and the method comprises the further step of defining a corresponding plurality of aligned nozzle openings in said deposited polymeric material.

Optionally, said corresponding plurality of aligned nozzle openings are defined by photopatterning said polymeric material.

Optionally, step (c) is performed after step (b), and said polymeric material is used as a mask for etching said nozzle surface.

Optionally, said polymeric material is photopatterned to define a plurality of nozzle opening regions prior to etching said nozzle surface.

Optionally, (c) is performed after step (b), and step (c) comprises the steps of:

- depositing a mask on said polymeric material;
- patterning said mask so as to unmask said polymeric material in a plurality of nozzle opening regions;
- etching said unmasked polymeric material and said underlying nozzle surface to define the plurality of nozzle openings; and
- removing said mask.

Optionally, said mask is photoresist, and said photoresist is removed by ashing.

In a further aspect the present invention provides a printhead obtained or obtainable by the method of the present invention.

In an embodiment ~~second aspect~~ the present invention provides a printhead having an ink ejection face, wherein at least part of the ink ejection face is coated with a hydrophobic polymeric material selected from the group comprising: polymerized siloxanes and fluorinated polyolefins.

Optionally, said polymeric material is resistant to removal by ashing.

Optionally, said polymeric material forms a passivating surface oxide in an oxygen plasma.

Optionally, said polymeric material recovers its hydrophobicity after being subjected to an oxygen plasma.

Optionally, the polymeric material is selected from the group comprising: polydimethylsiloxane (PDMS) and perfluorinated polyethylene (PFPE).

In a further embodiment ~~aspect~~ the present invention provides a printhead comprising a plurality of nozzle assemblies formed on a substrate, each nozzle assembly comprising: a nozzle chamber, a nozzle opening defined in a roof of the nozzle chamber and an actuator for ejecting ink through the nozzle opening,

Optionally, a nozzle surface, having the hydrophobic polymer coated thereon, at least partially defines the ink ejection face.

Optionally, each roof defines at least part of the nozzle surface of the printhead, each roof having a hydrophobic outside surface relative to the inside surfaces of each nozzle chamber by virtue of said hydrophobic coating.

Optionally, at least part of the ink ejection face has a contact angle of more than 90° and the inside surfaces of the nozzle chambers have a contact angle of less than 90°.

In a further embodiment~~third aspect~~ the present invention provides a nozzle assembly for an inkjet printhead, said nozzle assembly comprising:

a nozzle chamber having a roof, said roof having a moving portion moveable relative to a static portion and a nozzle opening defined in said roof, such that movement of said moving portion relative to said static portion causes ejection of ink through the nozzle opening;

an actuator for moving said moving portion relative to said static portion;

and

a mechanical seal interconnecting said moving portion and said static portion,

wherein said mechanical seal comprises a polymeric material selected from the group comprising: polymerized siloxanes and fluorinated polyolefins.

Optionally, said nozzle opening is defined in said moving portion.

Optionally, said nozzle opening is defined in said static portion.

Optionally, said actuator is a thermal bend actuator comprising:

a first active element for connection to drive circuitry; and

a second passive element mechanically cooperating with the first element,

such that when a current is passed through the first element, the first element expands relative to the second element, resulting in bending of the actuator.

Optionally, said first and second elements are cantilever beams.

Optionally, said thermal bend actuator defines at least part of the moving portion of said roof, whereby actuation of said actuator moves said actuator towards a floor of said nozzle chamber.

Optionally, the polymeric material has a Young's modulus of less than 1000 MPa.

Optionally, the polymeric material is selected from the group comprising: polydimethylsiloxane (PDMS) and perfluorinated polyethylene (PFPE).