**Supplementary Figure 1**

Optical microscope images of nylon templates used to fabricate PVDF scaffolds.

Optical microscope images of nylon templates for obtaining PVDF scaffolds with pore diameters of a) 60 and b) 150 μm. The scale bar (100 μm) is valid for both images.
Supplementary Figure 2

Optical microscope images of pre-molds used to fabricate patterned porous PVDF structures.

Optical microscope images of: a) SU-8 pre-mold fabricated by photolithography; b) PDMS mold fabricated by replica molding using the SU-8 pre-mold. The scale bar (150 μm) is valid for both images.
SUPPLEMENTARY METHODS

MATERIALS

REAGENTS

Common reagents
• PVDF (Solef® 1010, Solvay)

Optional copolymers
• PVDF-TrFE 70/30 (70 mol% vinylidene fluoride monomer; 30 mol% trifluoroethylene; Solvay)
• PVDF-CTFE (Solef® 31508, Solvay)
• PVDF-HFP (Solef® 21216, Solvay)

Films by doctor blade
• Dimethylformamide – DMF (Merk, cat. no. 1.03053.2511) ! CAUTION It is toxic, avoid direct contact and always handle it in the fume hood
• Acetone (99%, Merck, cas. no. 67-64-1)

Films by spin-coating
• Dimethylformamide – DMF (Merk, cat. no. 1.03053.2511) ! CAUTION It is toxic, avoid direct contact and always handle it in the fume hood
• Acetone (99%, Merck, cas. no. 67-64-1)

Films by printing processes
• Dimethylformamide – DMF (Merk, cat. no. 1.03053.2511) ! CAUTION It is toxic, avoid direct contact and always handle it in the fume hood
• Acetone (99%, Merck, cas. no. 67-64-1)

Porous films by non-solvent induced phase separation
• Dimethylformamide – DMF (Merk, cat. no. 1.03053.2511) ! CAUTION It is toxic, avoid direct contact and always handle it in the fume hood
• Acetone (99%, Merck, cas. no. 67-64-1)

Porous films by temperature-induced phase separation
• Dimethylformamide – DMF (Merk, cat. no. 1.03053.2511) ! CAUTION It is toxic, avoid direct contact and always handle it in the fume hood
• Acetone (99%, Merck, cas. no. 67-64-1)

Scaffolds by solvent-casting particulate leaching
• Dimethylformamide – DMF (Merk, cat. no. 1.03053.2511) ! CAUTION It is toxic, avoid direct contact and always handle it in the fume hood
• Sodium chloride (99%, Fisher scientific, cat. no. BP358-212)

Scaffolds by solvent-casting 3D nylon template
• Dimethylformamide – DMF (Merk, cat. no. 1.03053.2511) ! CAUTION It is toxic, avoid direct contact and always handle it in the fume hood
• Formic acid (Sigma Aldrich, cat. no. F0507-1L)

Scaffolds by freeze extraction with a 3D PVA template
• Dimethylformamide – DMF (Merk, cat. no. 1.03053.2511) ! CAUTION It is toxic, avoid direct contact and always handle it in the fume hood
• Ethanol (Sigma Aldrich, cat. no. 64-17-5)

Patterned porous structures by replica molding
• Sylgard 184 silicone elastomer base and Sylgard 184 elastomer curing agent (Dow Corning)
• Dimethylformamide – DMF (Merk, cat. no. 1.03053.2511) ! CAUTION It is toxic, avoid direct contact and always handle it in the fume hood
Fibers and spheres by electrospinning/electrospray
- Dimethylformamide – DMF (Merk, cat. no. 1.03053.2511) ! CAUTION It is toxic, avoid direct contact and always handle it in the fume hood
- Tetrahydrofuran – THF (Merk, cat. no. 109-99-9) ! CAUTION It is toxic, avoid direct contact and always handle it in the fume hood

EQUIPMENTS

Common equipments
- Analytical balance (A&D Instruments, cat. no GR-200)

Films by doctor blade
- Glass beaker (25 mL, Labbox, cat. no. BKL3-025-012)
- Spatula (Labbox, cat. no SPTS-001-005)
- Pipette (10 mL, Labbox, cat. no MPIA-010-005)
- Rubber pipette filler (Labbox, cat. no EAS5-001-001)
- Magnetic stirrer (Ika, Model C-MAG HS 7)
- Stir bar (Labbox, cat. no MAGC-625-005)
- Parafilm (Labbox, cat. no PRFL-001-001)
- Home-made glass substrates with 20 x 30 cm and a thickness of 5 mm (commercial alternative Glass substrates plates (100.0x80.0xT2.5mm, Optics, BK7S-C-S-10000800-0250)
- Air oven (Binder, cat. No Model FD 23)
- Linkam TST350 tensile stage
- Radiant ferroelectric premier II LC

Films by spin-coating
- Glass beaker (25 mL, Labbox, cat. no. BKL3-025-012)
- Spatula (Labbox, cat. no SPTS-001-005)
- Pipette (10 mL, Labbox, cat. no MPIA-010-005)
- Rubber pipette filler (Labbox, cat. no EAS5-001-001)
- Magnetic stirrer (Ika, Model C-MAG HS 7)
- Stir bar (Labbox, cat. no MAGC-625-005)
- Parafilm (Labbox, cat. no PRFL-001-001)
- Cover glass slides (40 x 24 mm, Sigma-Aldrich, cat. no CLS2975244-1000EA)
- Precision tips (22 G, Nordson EFD, cat. no. 7018266)
- Syringe (10 mL, Chirana, cat. no. CH010L)
- Spin-coater (Laurell, Model WS-6505-6NPP/A1/AR2)
- Hot-plate (Präzitherm, Model PZ23-2)

Films by inkjet printing
- Glass beaker (25 mL, Labbox, cat. no. BKL3-025-012)
- Spatula (Labbox, cat. no SPTS-001-005)
- Pipette (10 mL, Labbox, cat. no MPIA-010-005)
- Rubber pipette filler (Labbox, cat. no EAS5-001-001)
- Magnetic stirrer (Ika, Model C-MAG HS 7)
- Stir bar (Labbox, cat. no MAGC-625-005)
- Parafilm (Labbox, cat. no PRFL-001-001)
- 0.2 µm syringe filter (Filtres Fiorini, cat. no. 6002S25001)
- Jet printer Dimatix DMP-serie 2800 (Fujifilm Dimatix DMP series 2800, Inc., Santa Clara, USA)
- Cartridge with 1.5 mL drop volume cartridge, 16 nozzles each which have a 254 µm spacing and a 10 pL drop volume (DMC-11610, Fujifilm Dimatix, Inc.)
Films by screen printing
• Glass beaker (25 mL, Labbox, cat. no. BKL3-025-012)
• Spatula (Labbox, cat. no SPTS-001-005)
• Pipette (10 mL, Labbox, cat. no MPIA-010-005)
• Rubber pipette filler (Labbox, cat. no EAS5-001-001)
• Magnetic stirrer (Ika, Model C-MAG HS 7)
• Stir bar (Labbox, cat. no MAGC-625-005)
• Parafilm (Labbox, cat. no PRFL-001-001)
• Home-made screen printing machine (Properties of the home-made screen printing machine are described in the Introduction Option D. Nevertheless, all processes performed with this equipment can be reproduced in commercial, automatic or semi-automatic screen printing equipment, such as “F1 Semi-Automatic Screen Printer PRINT” or automatic-ROQprint NANO from ROQ.
• White polyester mesh with 62 wires per cm, an opening of 64 µm (Sefar)
• Squeege (Jiamei Screen Printing Equipment Co., LTD.)

Films by spray printing
• Glass beaker (25 mL, Labbox, cat. no. BKL3-025-012)
• Spatula (Labbox, cat. no SPTS-001-005)
• Pipette (10 mL, Labbox, cat. no MPIA-010-005)
• Rubber pipette filler (Labbox, cat. no EAS5-001-001)
• Magnetic stirrer (Ika, Model C-MAG HS 7)
• Stir bar (Labbox, cat. no MAGC-625-005)
• Parafilm (Labbox, cat. no PRFL-001-001)
• Commercial airbrush Kit Duo Ventus AIRBRUSH TITAN 0,25 Y APOLO 0,35 (Monduber)
• Compression Argon air
• Polyethylene naphtholate (PEN) films with a thickness of 125 µm (Dupont Teijin Films Teonex®, cat. no. Q65FA)

Porous films by non-solvent induced phase separation
• Glass beaker (25 mL, Labbox, cat. no. BKL3-025-012)
• Spatula (Labbox, cat. no SPTS-001-005)
• Pipette (10 mL, Labbox, cat. no MPIA-010-005)
• Rubber pipette filler (Labbox, cat. no EAS5-001-001)
• Magnetic stirrer (Ika, Model C-MAG HS 7)
• Stir bar (Labbox, cat. no MAGC-625-005)
• Parafilm (Labbox, cat. no PRFL-001-001)
• Home-made glass substrates with 20 x 30 cm and a thickness of 5 mm (commercial alternative Glass substrates plates (100.0x80.0xT2.5mm, Optics, BK7S-C-S-10000800-0250)
• Hot-plate (Präzitherm, Model PZ23-2)
• Thermometer (Labbox, cat. No THER-060-001)
• Bar coater (Elcometer, cat. No K003357M004)
• Crystallizing dish with spout (2000 mL, Labbox, cat. no. CDI3-2K0-002)
• Tissue paper

Porous films by temperature-induced phase separation
• Glass beaker (25 mL, Labbox, cat. no. BKL3-025-012)
• Spatula (Labbox, cat. no SPTS-001-005)
• Pipette (10 mL, Labbox, cat. no MPIA-010-005)
• Rubber pipette filler (Labbox, cat. no EAS5-001-001)
• Magnetic stirrer (Ika, Model C-MAG HS 7)
• Stir bar (Labbox, cat. no MAGC-625-005)
• Parafilm (Labbox, cat. no PRFL-001-001)
• Home-made glass substrates with 20 x 30 cm and a thickness of 5 mm (commercial alternative Glass substrates plates (100.0x80.0xT2.5mm, Optics, BK7S-C-S-10000800-0250)
• Air oven (Binder, cat. No Model FD 23)
• Bar coater (Elcometer, cat. No K000357M004)
• Glass substrates plates (100.0x80.0xT2.5mm, Optics, BK7S-C-S-10000800-0250)
• Tissue paper

Scaffolds by solvent-casting particulate leaching
• Glass beaker (25 mL, Labbox, cat. no. BKL3-025-012)
• Spatula (Labbox, cat. no SPTS-001-005)
• Pipette (10 mL, Labbox, cat. no MPIA-010-005)
• Rubber pipette filler (Labbox, cat. no EAS5-001-001)
• Magnetic stirrer (Ika, Model C-MAG HS 7)
• Stir bar (Labbox, cat. no MAGC-625-005)
• Parafilm (Labbox, cat. no PRFL-001-001)
• Glass rod (Labbox, cat. no. STRN-150-005)
• Petri dish (Labbox, cat. no. PDIN-060)

Scaffolds by solvent-casting 3D nylon template
• Glass beaker (25 mL, Labbox, cat. no. BKL3-025-012)
• Spatula (Labbox, cat. no SPTS-001-005)
• Pipette (10 mL, Labbox, cat. no MPIA-010-005)
• Rubber pipette filler (Labbox, cat. no EAS5-001-001)
• Magnetic stirrer (Ika, Model C-MAG HS 7)
• Stir bar (Labbox, cat. no MAGC-625-005)
• Parafilm (Labbox, cat. no PRFL-001-001)
• Nylon plates (Saatilon, see Figure S1 from Supplementary data) with a pore diameter of 60 and 150 μm
• Petri dish (Labbox, cat. no. PDIN-060)

Scaffolds by freeze extraction with a 3D PVA template
• Glass beaker (25 mL, Labbox, cat. no. BKL3-025-012)
• Spatula (Labbox, cat. no SPTS-001-005)
• Pipette (10 mL, Labbox, cat. no MPIA-010-005)
• Rubber pipette filler (Labbox, cat. no EAS5-001-001)
• Magnetic stirrer (Ika, Model C-MAG HS 7)
• Stir bar (Labbox, cat. no MAGC-625-005)
• Parafilm (Labbox, cat. no PRFL-001-001)
• PVA filaments with 1.75 mm (Plastic2Print)
• Freezer at -80 °C
• Liquid nitrogen
• Petri dish (Labbox, cat. no. PDIN-060)

Patterned porous structures by replica molding
• Pre-mold (SU-8 mold manufactured by photolithography, see Figure S2a from Supplementary data)
• Microscope glass slides (76 x 26 mm, Auxilab, cat. no BPB001)
• Aluminum tape (Tesa, cat. no 56223)
• Glass beaker (25 mL, Labbox, cat. no. BKL3-025-012)
• Glass rod (Labbox, cat. no STRT-300-001)
• Homemade vacuum system
• Hot plate (Präzitherm, Model PZ23-2)
• Plasma system (Electronic Diener, Model Zapto).
• Spatula (Labbox, cat. no SPTS-001-005)
• Pipette (10 mL, Labbox, cat. no MPIA-010-005)
• Rubber pipette filler (Labbox, cat. no EAS5-001-001)
• Magnetic stirrer (Ika, Model C-MAG HS 7)
• Stir bar (Labbox, cat. no MAGC-625-005)
• Parafilm (Labbox, cat. no PRFL-001-001)
Fibers and spheres by electrospinning/electrospray

- Glass beaker (25 mL, Labbox, cat. no. BKL3-025-012)
- Spatula (Labbox, cat. no SPTS-001-005)
- Pipette (10 mL, Labbox, cat. no MPIA-010-005)
- Rubber pipette filler (Labbox, cat. no EAS5-001-001)
- Magnetic stirrer (Ika, Model C-MAG HS 7)
- Stir bar (Labbox, cat. no MAGC-625-005)
- Parafilm (Labbox, cat. no PRFL-001-001)
- High voltage power supply (Matsusada, cat. no. AU-30P1- LC)
- Syringe pump (Syringe pump, cat. no. NE-1000)
- Precision tips (22 G, Nordson EFD, cat. no. 7018266)
- Syringe (10 mL, Chirana, cat. no. CH010L)
- Aluminum foil
- Homemade rotating drum
- Alligator clips (McMaster-Carr, cat. no. 7236K252)
- Insulated electrical wire