

## Supporting Information

### **Rapid fabrication of poly(methyl methacrylate) devices for lab-on-a-chip applications using acetic acid and UV treatment**

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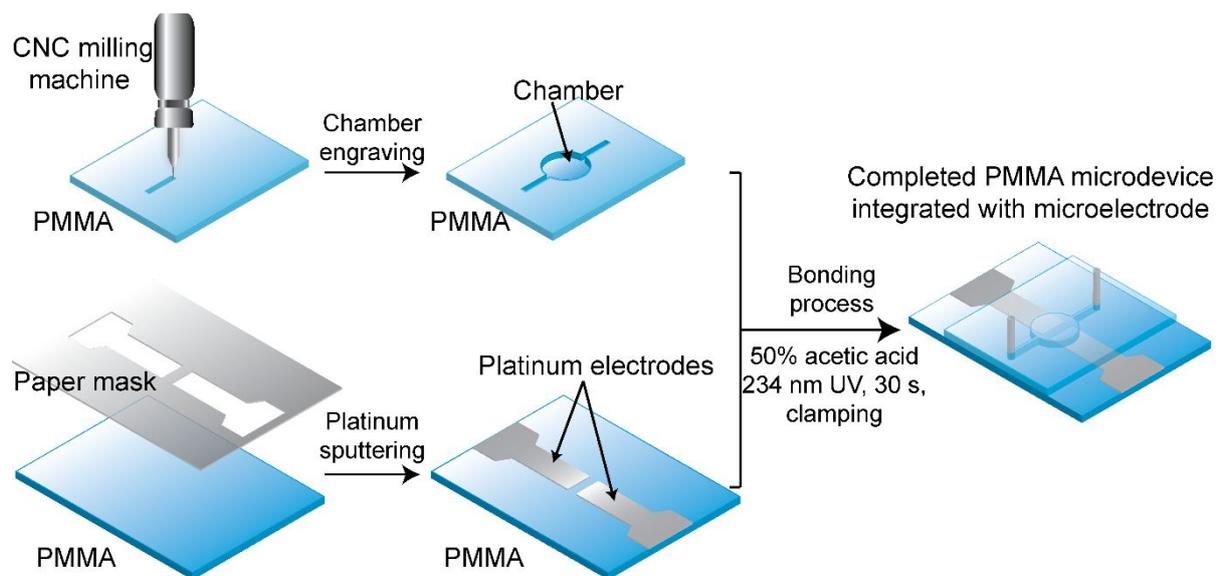
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**Table S1.** Comparison of different solvent bonding methods

Bonding process	Bond strength	Method description	Reference
<ul style="list-style-type: none"> <li>Acetic acid 50%</li> <li>UV irradiation (30 s)</li> <li>Pressure (using clamp)</li> <li>Total process time: less than 1 min</li> </ul>	11.75 MPa	Advantages: <ul style="list-style-type: none"> <li>Rapid and straightforward</li> <li>Low cost</li> <li>Non-toxic</li> <li>High bond strength</li> <li>Deformation-free and clogging-free</li> <li>Applicable for mass-production</li> </ul> Disadvantages: <ul style="list-style-type: none"> <li>Requirement of well-ventilated facility to eliminate acetic acid smell</li> </ul>	This work
<ul style="list-style-type: none"> <li>Ethanol 95%</li> <li>Spin-coating and UV irradiation</li> <li>Total process time: around 3 min</li> </ul>	>1 MPa	Advantages: <ul style="list-style-type: none"> <li>Simple and quick</li> <li>Low temperature</li> </ul> Disadvantages: <ul style="list-style-type: none"> <li>Surface roughness affects the bonding efficiency</li> <li>Solvent is flammable</li> </ul>	[1]
<ul style="list-style-type: none"> <li>1,2-dichloroethane and ethanol (2:8)</li> <li>Room temperature</li> <li>Pressure (0.1 MPa)</li> <li>Total process time: around 7 min</li> </ul>	3.8 MPa	Advantages: <ul style="list-style-type: none"> <li>Straightforward and simple</li> <li>Low temperature</li> </ul> Disadvantages: <ul style="list-style-type: none"> <li>Solvent is highly flammable and volatile</li> <li>Requirement of pressure machine</li> </ul>	[2]
<ul style="list-style-type: none"> <li>Chloroform and ethanol</li> <li>Heat at 40°C for 10 min</li> <li>Pressure (using quartz glass fixture)</li> <li>Total process time: around 1 h</li> </ul>	2.675 MPa	Advantages: <ul style="list-style-type: none"> <li>Straightforward and simple</li> <li>Low pressure application</li> </ul> Disadvantages: <ul style="list-style-type: none"> <li>Chloroform is toxic</li> <li>Time-consuming</li> </ul>	[3]
<ul style="list-style-type: none"> <li>Acetonitrile</li> <li>Solvent exposure for 8 min</li> <li>Pressure (0.5 MPa)</li> <li>Total process time: around 15 min</li> </ul>	Not mentioned	Advantages: <ul style="list-style-type: none"> <li>Simple and versatile</li> <li>Low cost</li> </ul> Disadvantages: <ul style="list-style-type: none"> <li>Solvent is toxic and flammable</li> <li>Requirement of pressure machine</li> </ul>	[4]
<ul style="list-style-type: none"> <li>Isopropanol 100%</li> <li>Ultrasonic (8 s)</li> <li>Pressure (0.32 MPa)</li> <li>Total process time: less than 2 min</li> </ul>	2.25 MPa	Advantages: <ul style="list-style-type: none"> <li>Quick</li> <li>Low temperature</li> </ul> Disadvantages: <ul style="list-style-type: none"> <li>Solvent is highly flammable and volatile</li> <li>Requirement of pressure machine</li> </ul>	[5]

**References:**

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- (2) Lin, C. H.; Chao, C. H.; Lan, C. W. Low azeotropic solvent for bonding of PMMA microfluidic devices. *Sens. Actuator B-Chem.* **2007**, 121(2), 698-705.
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- (4) Sun, X.; Peeni, B. A.; Yang, W.; Becerril, H. A.; Woolley, A. T. Rapid prototyping of poly(methyl methacrylate) microfluidic systems using solvent imprinting and bonding. *J. Chromatogr. A* **2007**, 1162, 162-166.
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**Figure S1.** The overall schematic illustration of the fabrication of PMMA microdevice integrated with microelectrodes.