Problematic: What is the thickness of a spin coated PDMS layer?

The final thickness of a PDMS layer mainly depends on spin speed and spinning duration. Important parameters to get reproducible thickness of PDMS layer are:

- Spinning speed
- Spinning duration
- Type of PDMS
- Ratio of reticulating agent and PDMS
- Duration between mixing of PDMS/reticulating agent and spin-coating.
- Room temperature

Several publications give the thickness of the deposited layer depending on these conditions for example [1] (fig. 1), or [2] and [3] (fig. 2).

Figure 1: Dependence of the PDMS layer thickness as a function of spin speed for a rotation time of 5 min (left) and as a function of rotation time (right).

PDMS part A and part B (Sylgard 184, Dow Corning) mixed in a 10:1 (weight:weight) ratio and steered during 2 minutes. The PDMS was placed in vacuum desiccators for degassing (10–13 minutes). Total preparation time: 15 minutes, figure modified from [1].
Another source gives similar results on the thickness of the PDMS layer as a function of the spinning speed [3]:

![Graph showing PDMS thickness as a function of spin coating speed.](image)

<table>
<thead>
<tr>
<th>Spin-coating speed (rpm)</th>
<th>500</th>
<th>1000</th>
<th>1500</th>
<th>2000</th>
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<th>6000</th>
<th>8000</th>
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<tbody>
<tr>
<td>PDMS thickness (µm)</td>
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<tr>
<td>Balagadde et al. (2005)</td>
<td>220</td>
<td>77</td>
<td>52</td>
<td>36</td>
<td>28</td>
<td>19</td>
<td>13</td>
<td>8</td>
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<td>Measurements</td>
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<td>12</td>
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**Figure 2**: PDMS thickness as a function of spin speed, (Sylgard-184 PDMS just after base and agent were mixed in a 10:1 ratio). Closed circles are measurements with a spin time of t=30s, open circles are data points from [2] with t=60s, and the solid line is the theoretical fit $W=0.23 \omega^{-1.14}$ (W in meters, $\omega$ in rpm). The inset shows the same plot on logarithmic scales [3].

**References:**


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