Spin curves for ZEP520A for the Singh Center for Nanotechnology were studied under non-diluted and diluted conditions by weight.

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ZEP520A Spin Curves and Dilution Characterization

Abstract
Spin curves for ZEP520A from ZEON Chemicals for the Singh Center for Nanotechnology were studied under non-diluted and diluted conditions by weight.

Keywords
ZEP520A, Spin Curves, Spin, Curve, Dilution, Characterization

Comments
Spin curves for ZEP520A for the Singh Center for Nanotechnology were studied under non-diluted and diluted conditions by weight.

This technical report is available at ScholarlyCommons: https://repository.upenn.edu/scn_protocols/31
Goal:
This report documents the spin curves for ZEP520A electron beam lithography resist from ZEON Chemicals. Dilution by weight of ZEP520A vs spin speed from 1000 to 6000 rpm was generated for this work. The aim is to provide approximate dilutions using anisole to acquire a specific resist thickness at any given spin speed. The lower rpm for a given thickness implies a higher dilution and less resist material, which means less consumable waste.

Materials:
- ZEON Chemicals ZEP520A.
- Anisole
- Si wafers
- Two 80mL beakers
- One amber bottle

Equipment:
- ReynoldsTech Spinner
- Torrey Pines Scientific Hotplate
- Filmetrics F50
- Digital Scale to measure dilutions

Protocol:
**ZEP520A Dilution Protocol**
1. Place the first clean 80mL beaker onto digital scale and tare.
2. Using a pipette, place 5g of ZEP520A into the clean 80mL beaker. Remove beaker from scale.
3. Place the second clean 80mL beaker onto digital scale and tare.
4. Using a pipette, place 5g or 10g of anisole into the clean 80mL beaker.
5. Pour the contents of the anisole into the beaker containing the ZEP520A. Alternate pouring from one beaker to another to guarantee proper dilution.
6. When finished, pour the dilution into an amber bottle. Repeat steps 1-5 for more dilutions.

**Coat**
1. Mount wafer and ensure that it is centered.
2. Spin wafer at a fixed RPM for 60 seconds.

**Soft Bake**
1. Bake wafer at 180 °C for 90 seconds and allow wafer to cool after removal.

**Measurement**
1. Allow the Filmetrics F50 light to warm up for at least 5 minutes.
2. Click Baseline… to calibrate the tool using the SiO₂ and Si standards.
3. Mount wafer and select the ZEP520A on Si recipe.
4. Edit the recipe so that 85 points are measured on the wafer with a 1 cm edge exclusion.
5. Click Start to measure the resist thickness of each wafer.

Results:

<table>
<thead>
<tr>
<th>Spin Speed [RPM]</th>
<th>No Dilution</th>
<th>1:1 ZEP:Anisole</th>
<th>1:2 ZEP:Anisole</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000</td>
<td>730</td>
<td>225</td>
<td>128</td>
</tr>
<tr>
<td>1500</td>
<td>599</td>
<td>186</td>
<td>106</td>
</tr>
<tr>
<td>2000</td>
<td>523</td>
<td>163</td>
<td>92</td>
</tr>
<tr>
<td>3000</td>
<td>428</td>
<td>133</td>
<td>75</td>
</tr>
<tr>
<td>4000</td>
<td>371</td>
<td>116</td>
<td>64</td>
</tr>
<tr>
<td>5000</td>
<td>332</td>
<td>104</td>
<td>56</td>
</tr>
<tr>
<td>6000</td>
<td>305</td>
<td>96</td>
<td>53</td>
</tr>
</tbody>
</table>
Dilution by Weight

**No Dilution**
- 730
- 599
- 523
- 428
- 371
- 332
- 305

**1:1 ZEP:Anisole**
- 225
- 186
- 163
- 133
- 116
- 104
- 92

**1:2 ZEP:Anisole**
- 128
- 106
- 92
- 75
- 64
- 56
- 53

**Dilution by Weight**
- Thickness [nm]
- Spin Speed [RPM]

Additional Anisole [g] added to the Standard Dilution of ZEP520A [RPM]