HSQ Contrast

- XR-1541 Resist
- spun at 5000RPM for 60sec
- developed with 3 conditions
  - 2.3% TMAH for 70sec
  - 25% TMAH for 7sec
  - 25% TMAH for 70sec
Definition of contrast

\[ \gamma = \frac{d \ln r}{d \ln E} \quad (1) \]

where \( r \) is the dissolution rate from an exposure dose, \( E \).

\[ \gamma = \frac{1}{\log \left( \frac{D_{100}}{D_0} \right)} \quad (2), (3) \]

where \( D_{100} \) is the dose where all the positive resist is removed, and \( D_0 \) is the dose at which the positive resist begins to be removed. Dose is plotted on a log scale, and the resist is normalized from 1.0 to 0.

(2), Campbell, The Science and Engineering of Microelectronic Fabrication  
(3), SPIE Handbook, Volume 1: Microlithography, Section 2.7

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\[ m_{2.3\%} = 1.8 \]
\[ m_{25\% \_7sec} = 1.9 \]
\[ m_{25\% \_70sec} = 1.6 \]
\[
\gamma = \frac{1}{\log \left( \frac{D_{100}}{D_0} \right)}
\]

\[
\gamma_{2.3\%} = 1.95
\]

\[
\gamma_{25\% \_7\text{sec}} = 4.0
\]

\[
\gamma_{25\% \_70\text{sec}} = 5.7
\]
\[ \gamma = \frac{1}{\log\left(\frac{D_{100}}{D_0}\right)} \]

\[ \gamma_{2.3\%} = 1.9 \]

\[ \gamma_{25\%_{7sec}} = 3.6 \]

\[ \gamma_{25\%_{70sec}} = 5.1 \]