System polarization in optical set-ups

Last modified : Nov.22, 2013
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Reflection coefficient

Relationship between incident and reflected light

$$I_{R\_Pol1} = I_{I\_Pol1} \cdot R_{Pol1} \qquad I_{R\_Pol2} = I_{I\_Pol2} \cdot R_{Pol2}$$

Relationship between two incident light

$$I_{I\_Pol2} = \gamma \cdot I_{I\_Pol1}$$

Reflection coefficient

$$R = \frac{I_{R\_Pol1} + I_{R\_Pol2}}{I_{I\_Pol1} + I_{I\_Pol2}} = \frac{I_{I\_Pol1} \cdot R_{Pol1} + I_{I\_Pol2} \cdot R_{Pol2}}{I_{I\_Pol1} + I_{I\_Pol2}}$$

$$= \frac{I_{I\_Pol1} \cdot R_{Pol1} + \gamma \cdot I_{I\_Pol1} \cdot R_{Pol1}}{I_{I\_Pol1} + \gamma \cdot I_{I\_Pol1}} = \frac{R_{Pol1} + \gamma \cdot R_{Pol2}}{1 + \gamma}$$

ideally, $R = \frac{R_{Pol1} + R_{Pol2}}{2}$ when $\gamma = 1$

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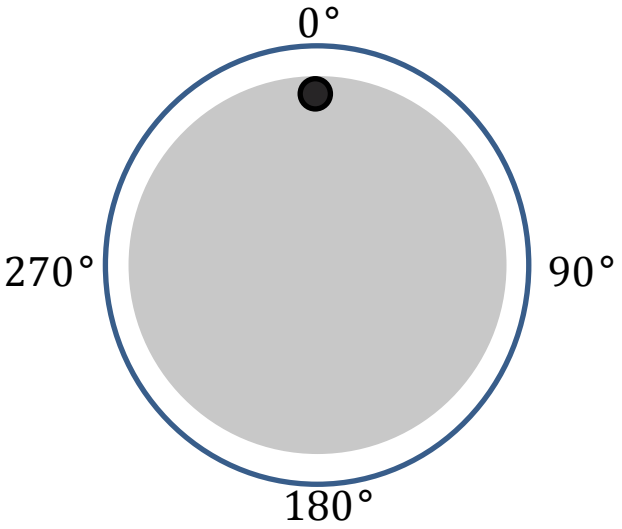
Polarizers to measure system polarization

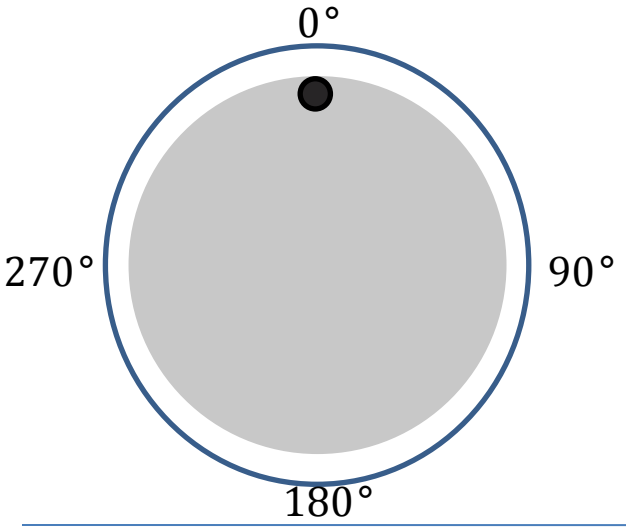
LPVISE100-A



Operating range : 400 – 700 nm
AR coating range : 350 – 700 nm
Size : 1 inch
Thickness : 3.5 mm

A dotted direction filters out “Magnetic fields”
~ H- fields dominates E- fields in this direction

LPNIRE100-B



Operating range : 600 – 1100 nm
AR coating range : 350 – 1050 nm
Size : 1 inch
Thickness : 3.5 mm

A dotted direction filters out “Electric fields”
~ E- fields dominates H- fields in this direction

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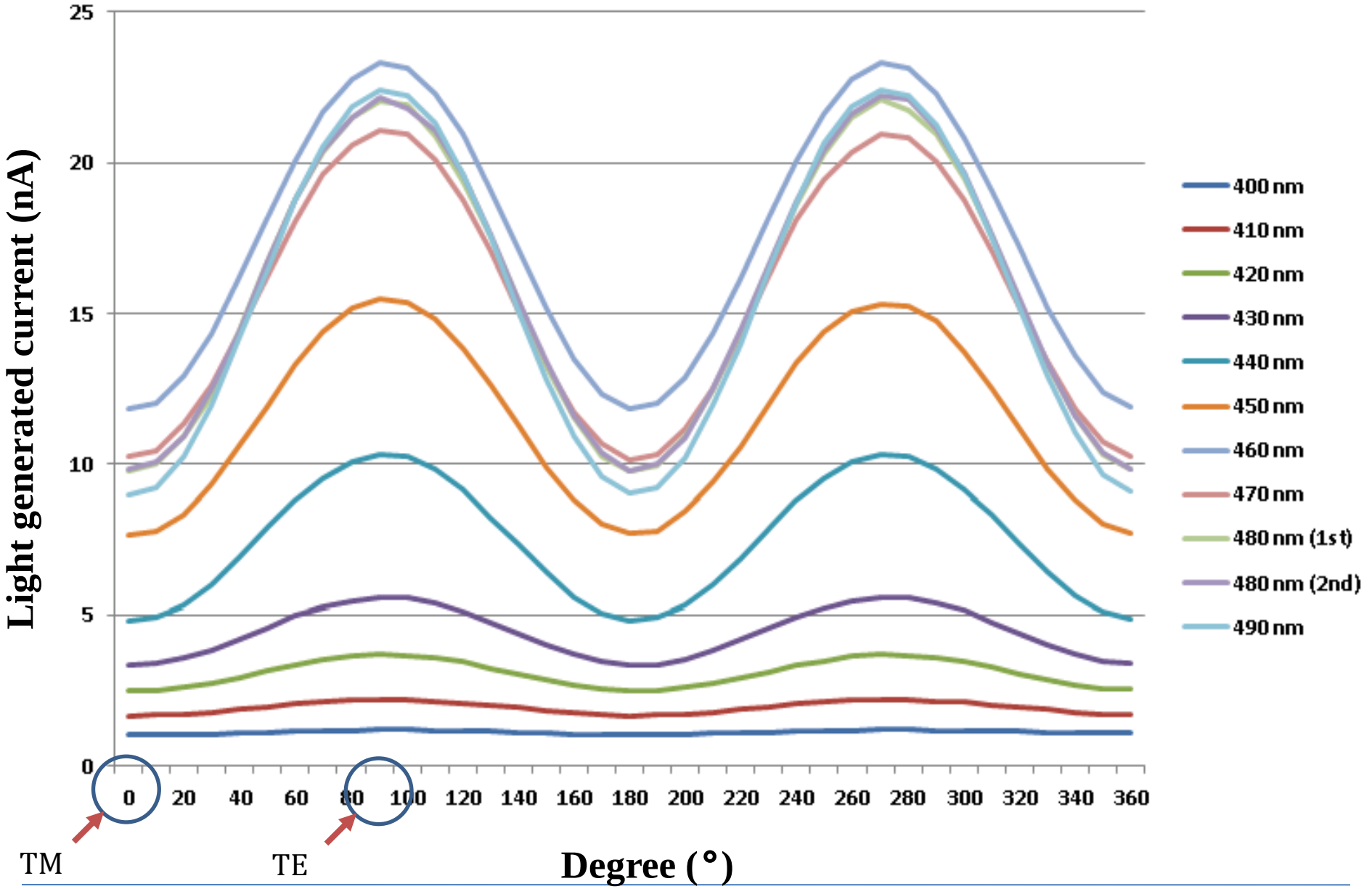
Measurement results at 400 nm < λ < 490 nm



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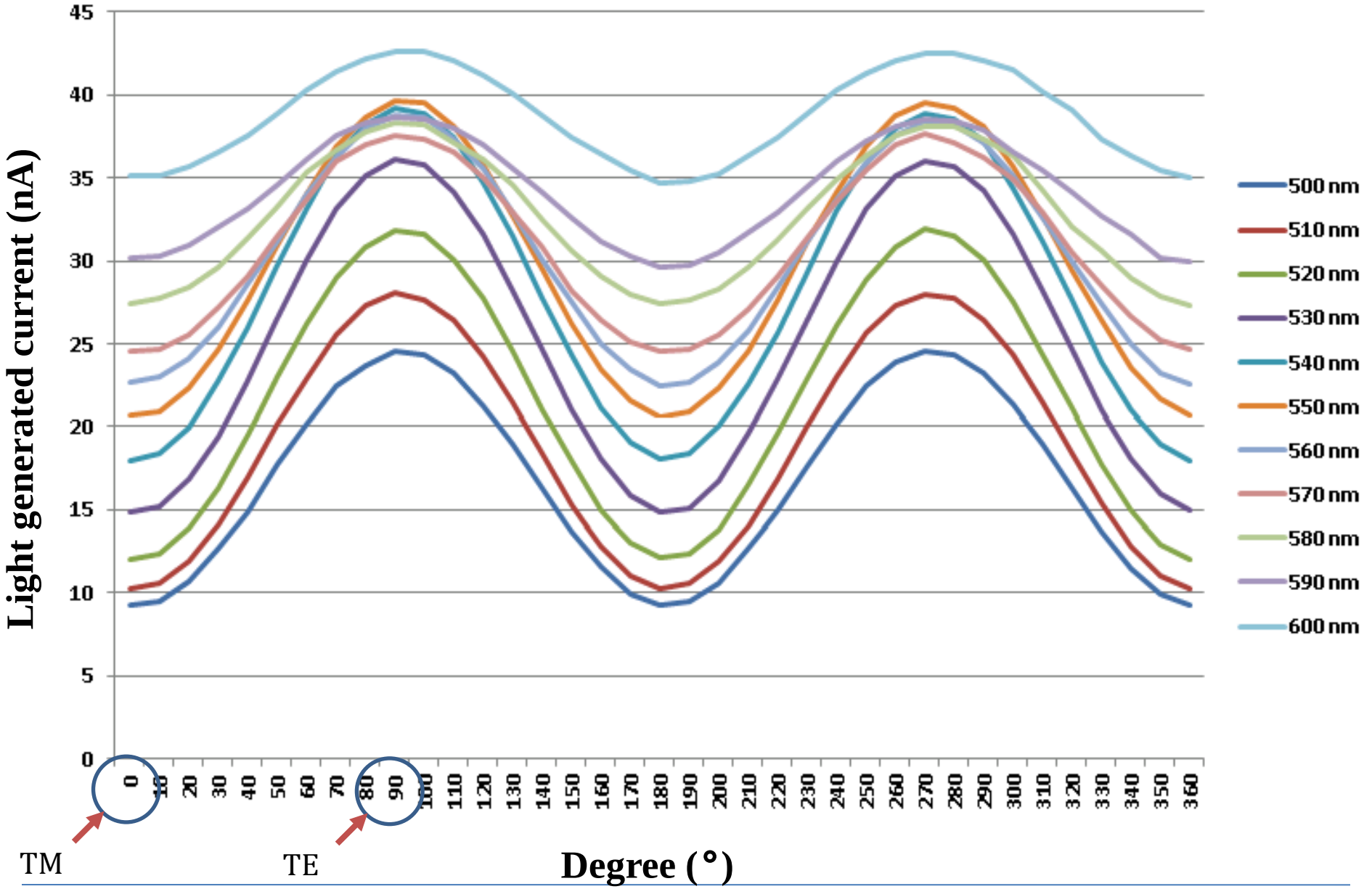
Measurement results at 500 nm < λ < 600 nm



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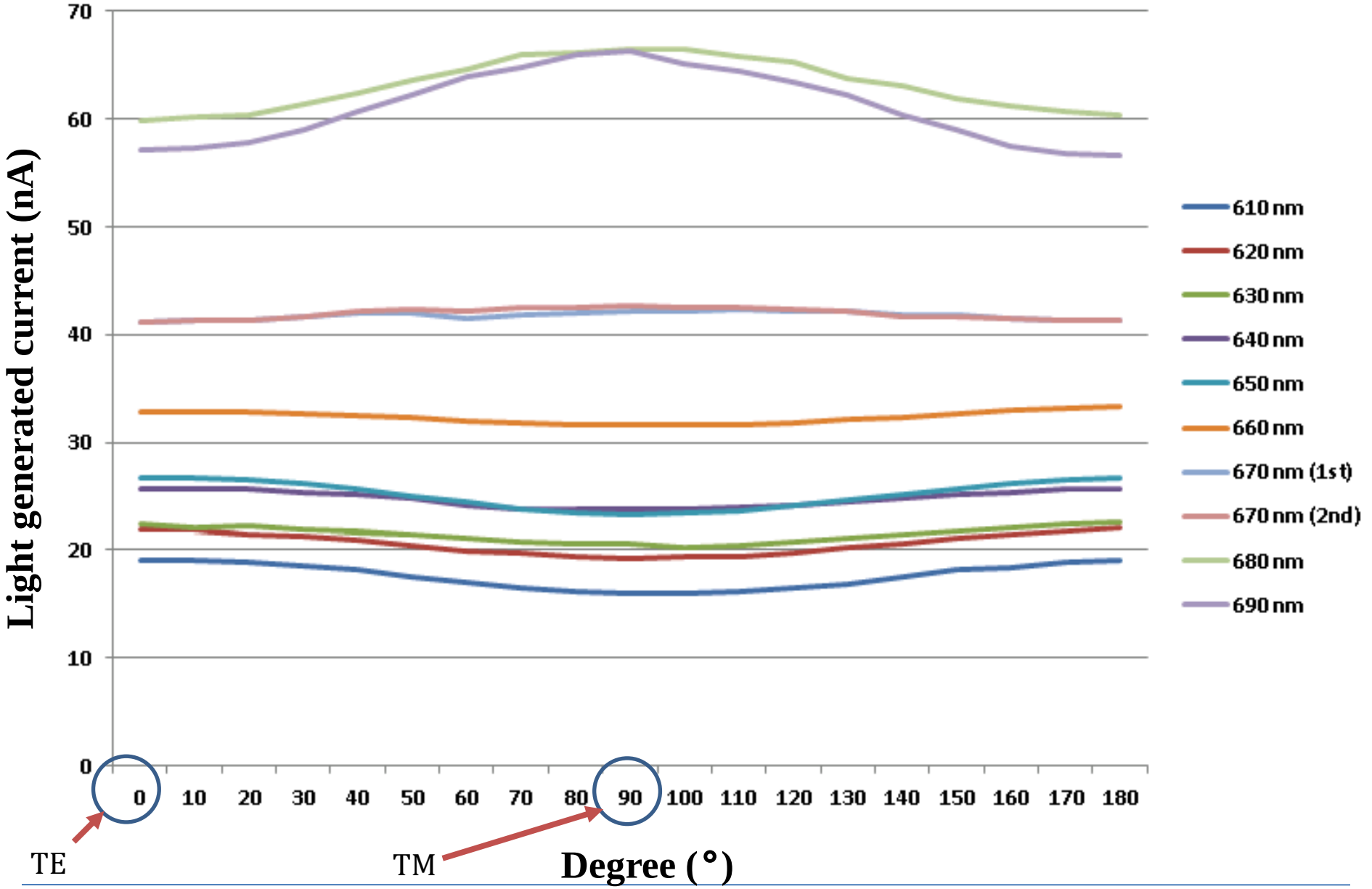
Measurement results at 610 nm < λ < 690 nm



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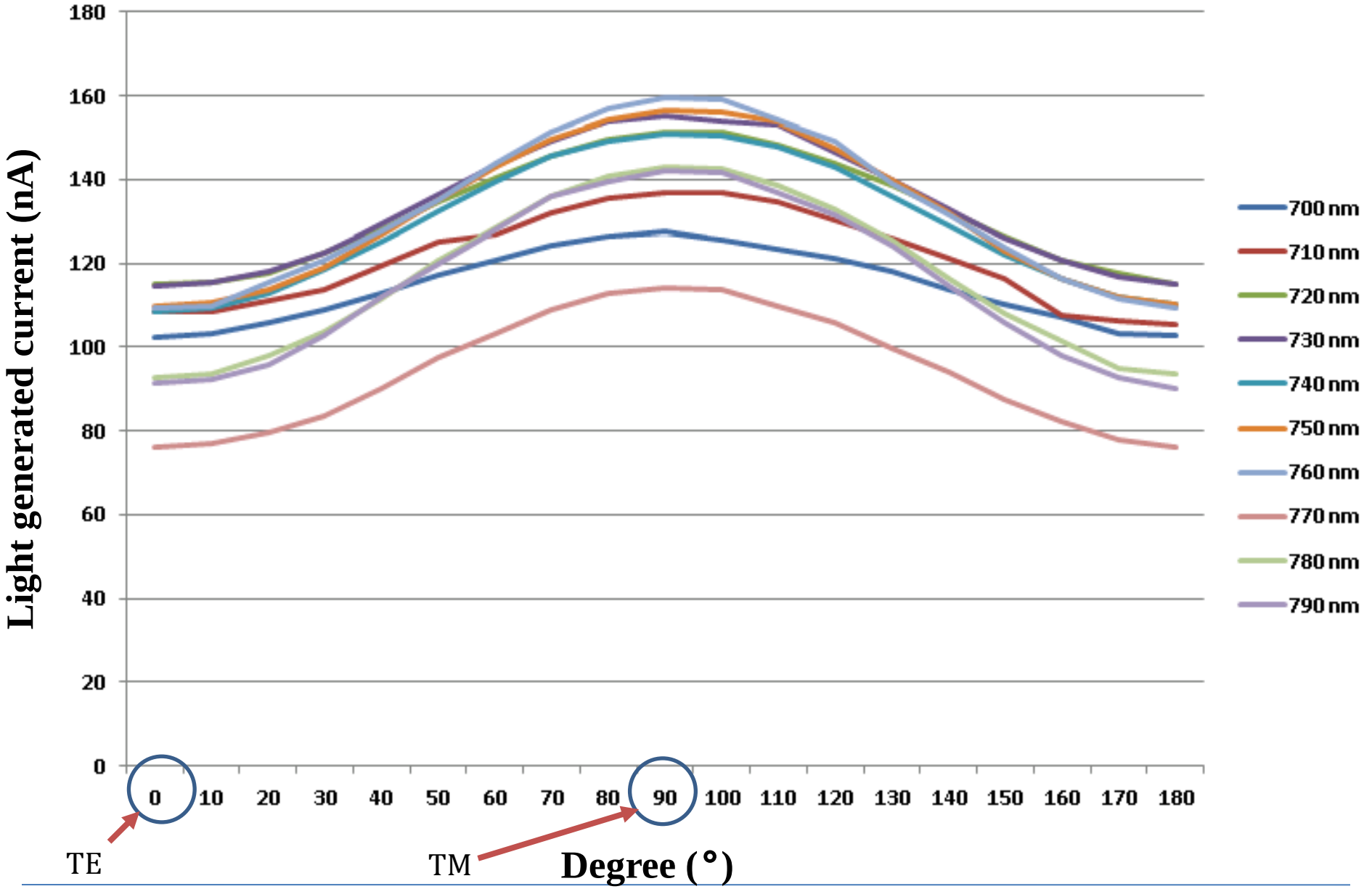
Measurement results at 700 nm < λ < 790 nm



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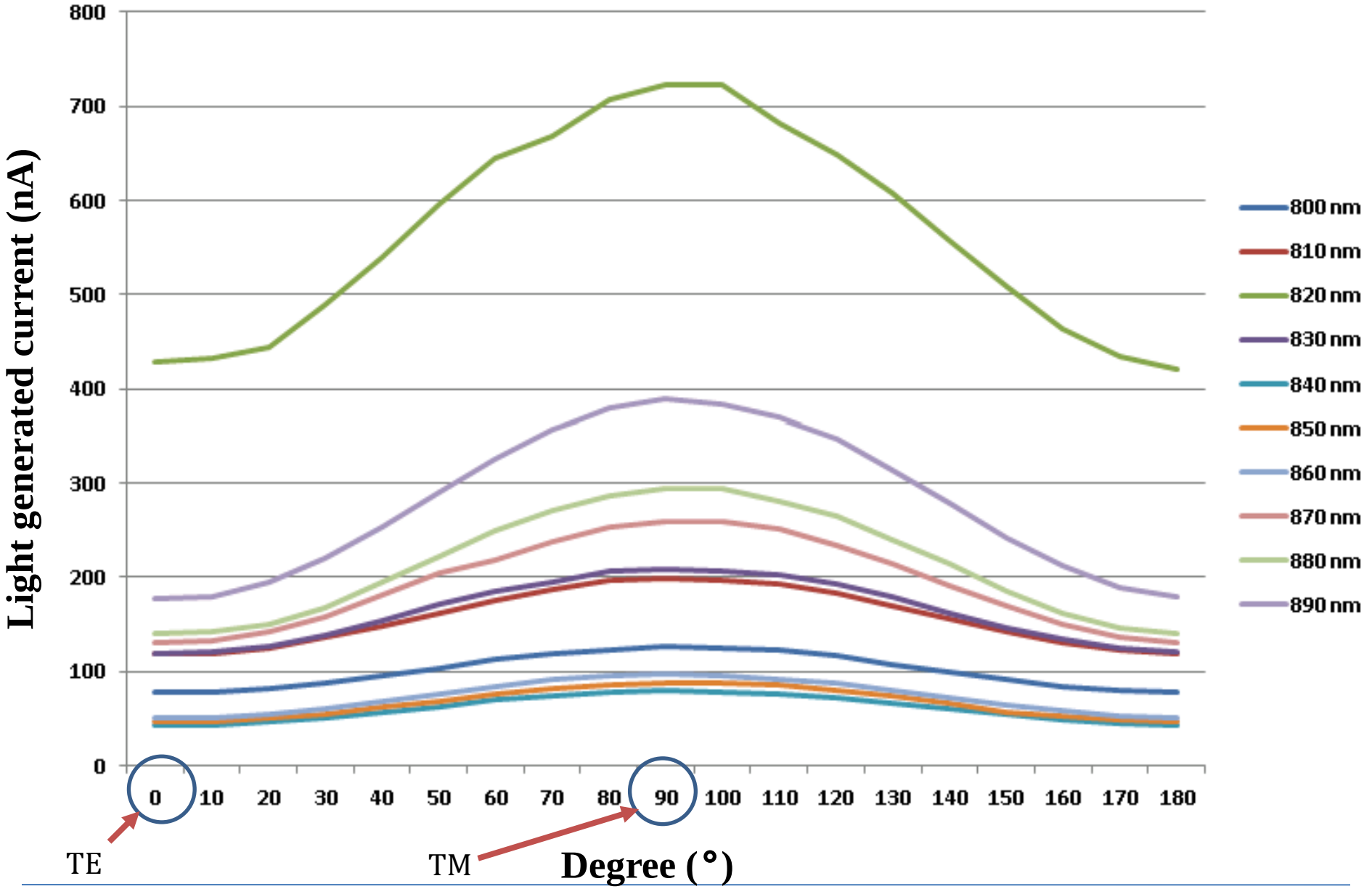
Measurement results at 800 nm < λ < 890 nm



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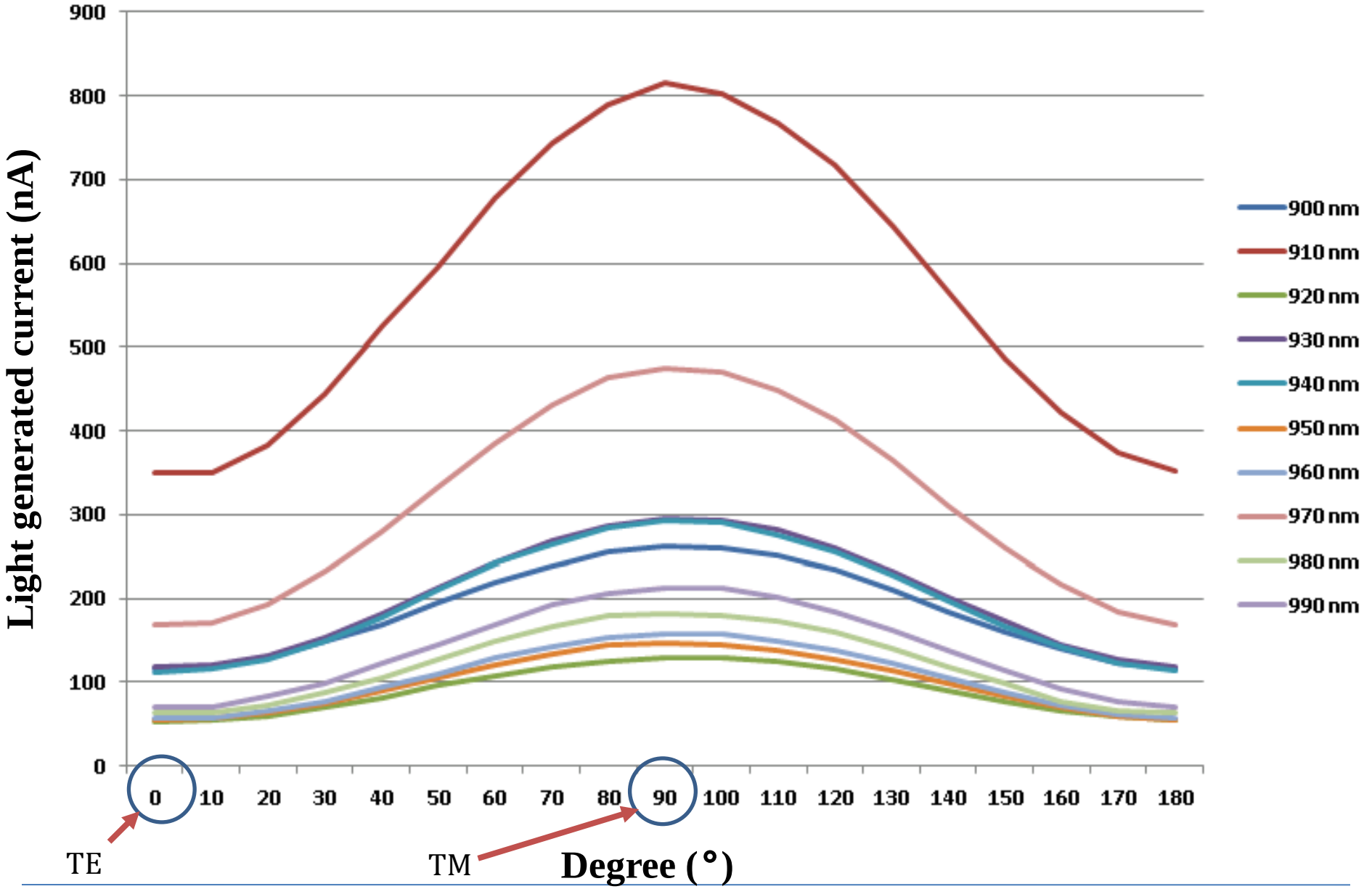
Measurement results at 900 nm < λ < 990 nm



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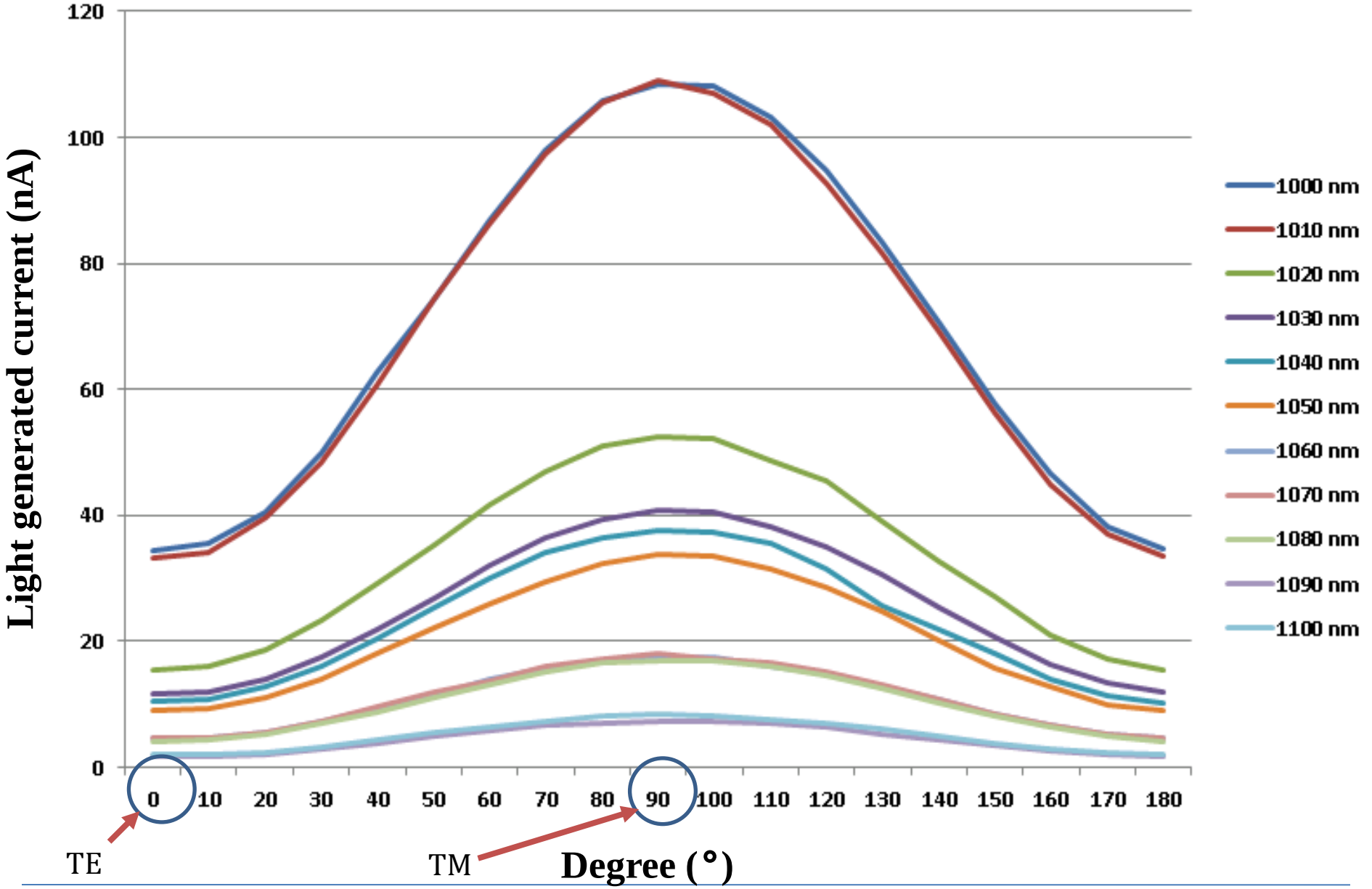
Measurement results at 1000 nm < λ < 1100 nm



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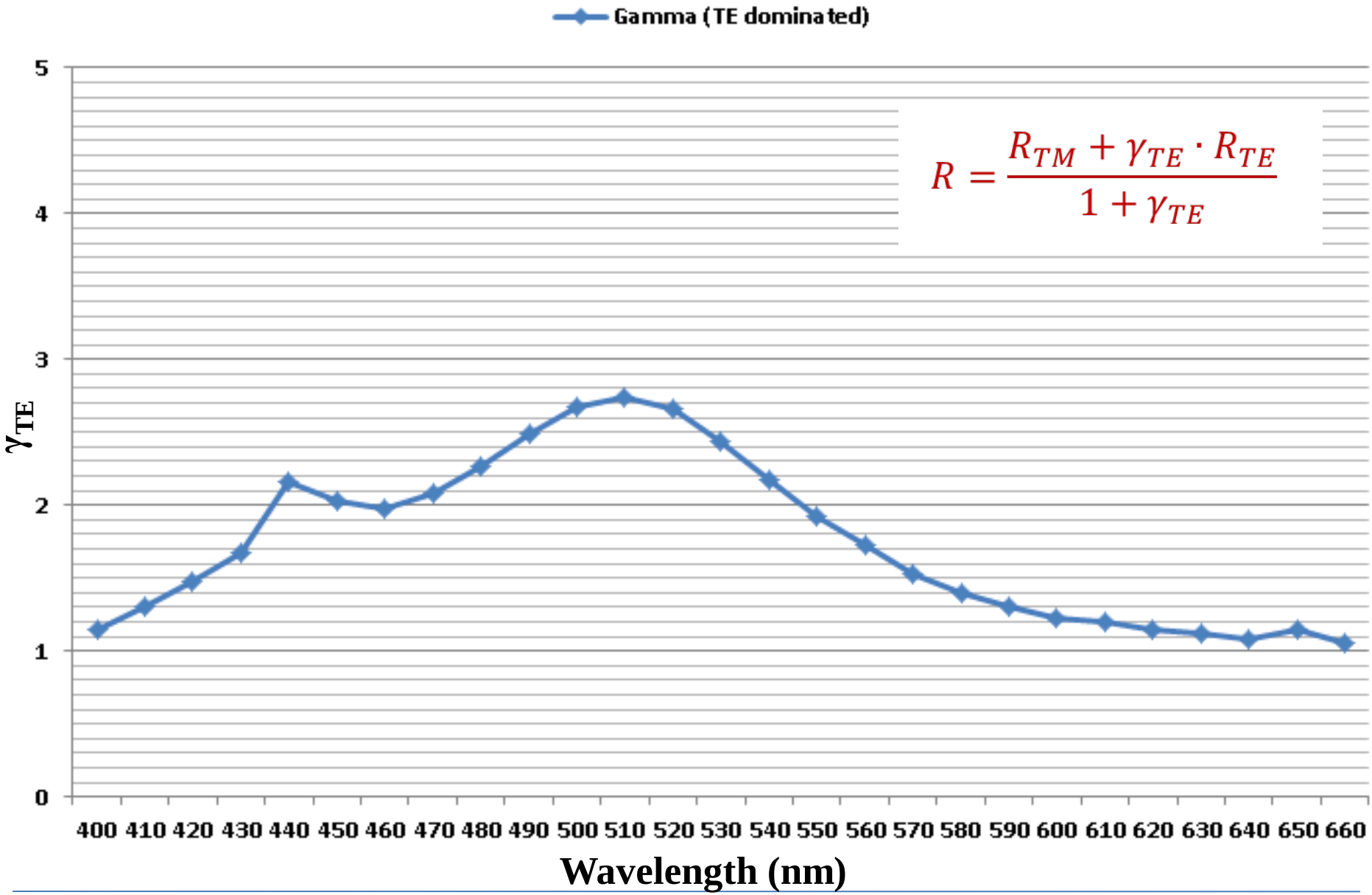
Gamma when TE dominates



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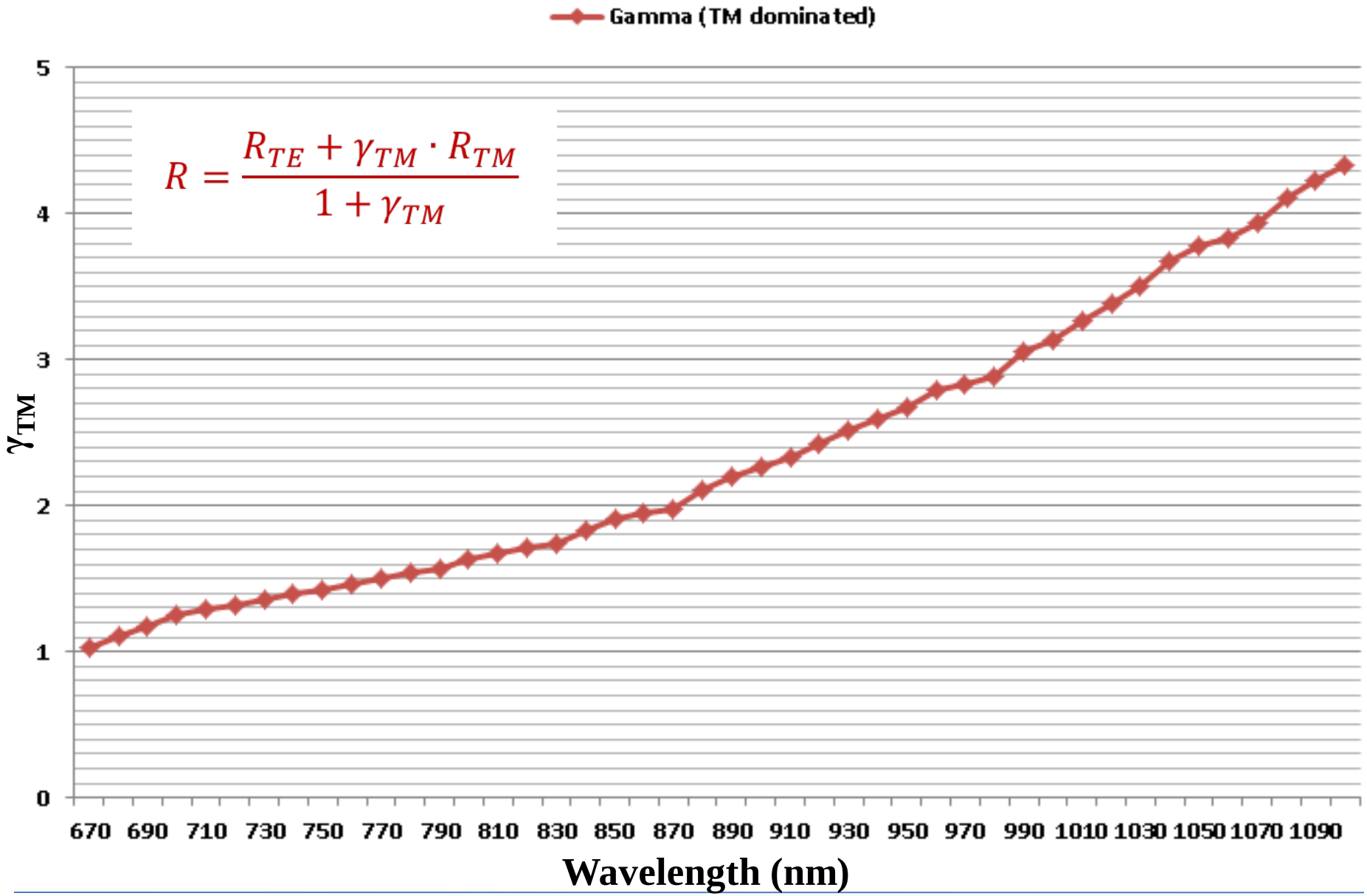
Gamma when TM dominates



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