

Supporting Information for

Comparison of Different Neural Network Architectures for Plasmonic Inverse Design

Qingxin Wu[†], Xiaozhong Li[‡], Wenqi Wang[†], Qiao Dong[†], Yibo Xiao[†], Xinyi Cao[†], Lianhui Wang^{*,†}, Li Gao^{*,†}

[†] State Key Laboratory for Organic Electronics and Information Displays, Institute of Advanced Materials, School of Materials Science and Engineering, Nanjing University of Posts and Telecommunications, Nanjing 210023, China

[‡] School of Electronic and Optical Engineering, Nanjing University of Science and Technology, Nanjing 210094, China

*Corresponding Authors

Li Gao – State Key Laboratory for Organic Electronics and Information Displays, Institute of Advanced Materials, School of Materials Science and Engineering, Nanjing University of Posts and Telecommunications, Nanjing, Jiangsu 210023, China; E-mail: iamlgao@njupt.edu.cn (L. G.)

Lianhui Wang – State Key Laboratory for Organic Electronics and Information Displays, Institute of Advanced Materials, School of Materials Science and Engineering, Nanjing University of Posts and Telecommunications, Nanjing, Jiangsu 210023, China; E-mail: iamlhwan@njupt.edu.cn (L. W.)

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The setting of hyperparameters plays an important role in the accuracy of neural network. By various tests, we fixed the best hyperparameters of forward and inverse network, which are shown in **Table S1** and **Table S2**, respectively.

Table S1. Optimal settings of some hyperparameters in forward network.

Parameters of network	Optimal settings
Initializers	W: uniform; b: zeros
Activation function	Relu
Loss	MAE (mean average error)
Optimizer	Nadam Optimizer
Learning rate	0.0005
$\beta_1; \beta_2$	0.9; 0.999
Layers	5
Nodes	300, 450, 450, 450, 450

Table S2. Optimal settings of some hyperparameters in inverse network.

Parameters of network	Optimal settings
Initializers	W: uniform; b: zeros
Activation function	ReLU
Loss	MAE (mean average error)
Optimizer	RMSprop Optimizer
Learning rate	0.001
Learning decay	0.99
Layers	4
Nodes	250, 250, 250, 250

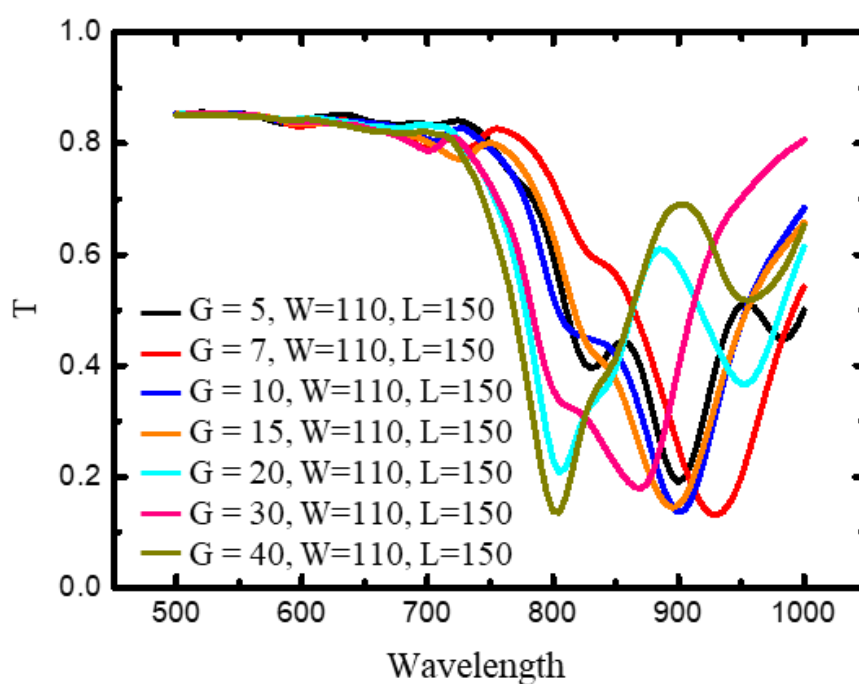


Figure S1. One test case for the sensitivity of spectra to G structure parameters (nm) by using FDTD method.

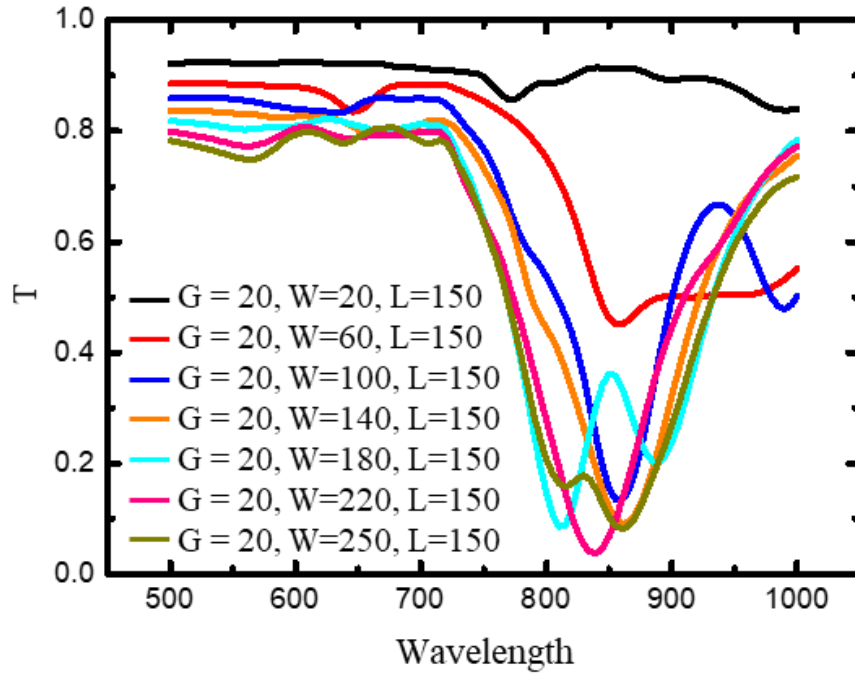


Figure S2. One test case for the sensitivity of spectra to W structure parameters (nm) by using FDTD method.

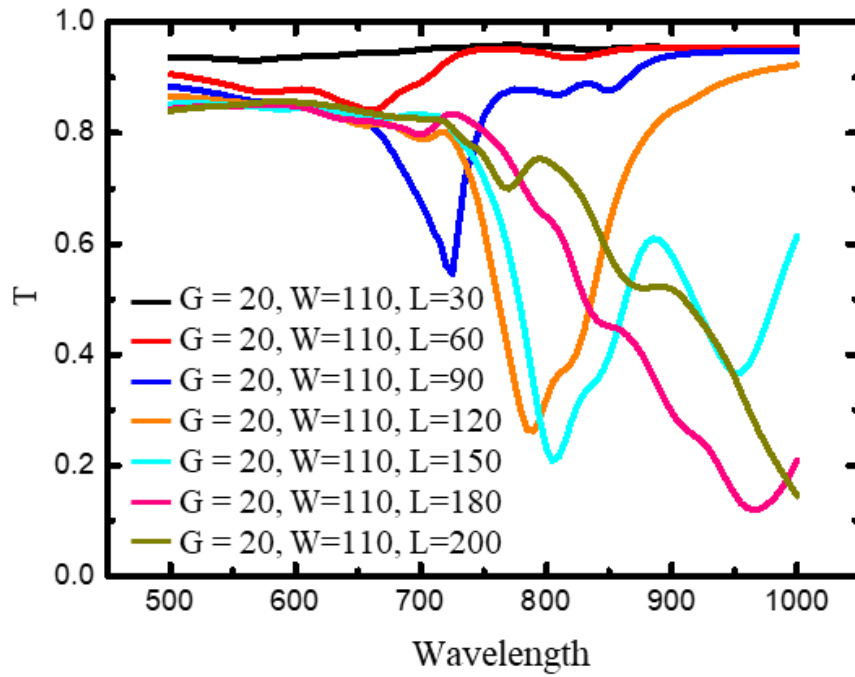


Figure S3. One test case for the sensitivity of spectra to L structure parameters (nm) by using FDTD method.