# Photo-thermal oxidation of polypropylene modeling of carbonyl index using artificial neural network

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**Abstract.** The aim of this work is to use multilayered perceptron artificial neural network (MLP-ANN) to modeling the carbonyl index during the photo-thermal oxidation of polypropylene (PP). A set of 87 data points is used to test the neural network. 80 % and 20% of the database were used for the training and the test of the model respectively. The best fitting training data was obtained with the architecture of (3 inputs neurons, 11 hidden neurons, and 1 output neuron). Quasi-Newton (trainbfg) training algorithm, logarithmic sigmoid transfer function and linear transfer function were used at the hidden and output layer respectively. The optimized ANN was obtained with a high correlation coefficient of R=0.999 and root mean square error RMSE=0.00016 during the generalization phase. The comparison between the experimental and calculated results show that the ANN model is able of predicted the carbonyl index during the photo-thermal oxidation of polypropylene.

**Keywords:** carbonyl index, photo-thermal oxidation, polypropylene, neural networks.