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Predicting kinetic triplets using a 1d convolutional neural network

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Abstract

In the past few years, methods of deep learning approaches such as convolutional neural networks have demonstrated their great power in tasks that are usually difficult, inefficient or expensive if conducted by human labor. Though these tools are very successful in the field of computer vision and are spreading soon in other fields, few papers have reported their uses in thermal analysis. This paper constructs a novel 1-dimensional convolutional neural network that is generally applicable for predicting kinetic parameters during pyrolysis. The proposed network makes efficient predictions of parameters in a unified pass instead of dealing with them separately. When compared with some classical methods including the commonly used Kissinger - Akahira - Sunose(KAS) method, Flynn-Wall-Ozawa(FWO) method and a multi-linear perceptron type artificial neural network, it demonstrates promising performance with high prediction accuracy and strong robustness to input noises.

Keywords:
kinetic parameters, convolutional neural network

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