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Development of Asbestos Containing Serpentinite Identification Method Using Hyperspectral Imaging

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Chrysotile is one of the asbestos types minerals and it is the fibrous form in nature. Also, chrysotile may cause health problems. Accordingly, it is better to be known whether chrysotile exists in a construction site in advance so that constructor can take a counter plan for worker health. However, identifying a small amount of chrysotile is very difficult. In a conventional way, experts quantify the amount of chrysotile by using a microscope and X-ray diffraction analysis. It is time-consuming and depends on individual skills. Speaking of identification techniques, it has been reported hyperspectral imaging and machine learning applications show good performance for mineral identification tasks. In this paper, a prediction model to identify chrysotile is trained with hyperspectral data of fibrous chrysotile and serpentine which is very similar to chrysotile. Finally, the model achieved 99.95% accuracy for test data. Then, the model has tested its identification capability by predicting hyperspectral data of the mixture of both serpentine and chrysotile that was unused in the training procedure and performed potential.

Keywords : Hyperspectral Imaging, Machine Learning, Asbestos