

Current situation and improvement of methylene blue adsorption testing method for bentonite

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Large amount of bentonite will be required as shielding material for radioactive waste disposal from nuclear power plant and contaminated soil management of Fukushima disaster. The testing methods of bentonite performances are important in terms of the safety of the disposal facility. Methylene blue (MB) adsorption test, which has generally been used for determining either cation exchange capacities (CEC) or surface areas of bentonite, is one of the important testing methods. However, current testing method of MB adsorption is different for each company and it is difficult to compare the performance of bentonite products. Since the current standard testing methods, which are developed by JBAS in the 1970s, are obsolete already, it is necessary to renew the standard testing methods. Therefore, we are planning to propose new standard testing methods for bentonite as JIS, based on this study.

In this study, we interviewed 13 companies and conducted questionnaire about the details of the current MB adsorption testing method. As the result, 10 companies are currently doing MB adsorption test. Of the 10 companies, MB adsorption test based on conventional JBAS method is conducted in eight companies. In addition, four companies are using their own methods, such as colorimetric method which is not defined in the JBAS, including 2 companies using compound of JBAS and colorimetric methods. The tests based on conventional JBAS methods have variation among companies in terms of determining the end point, reagents and sample preparations. Short testing time and simple decision of end point were raised by several companies, as the reasons for using their own methods such as colorimetric method.

As consider in result of interview, the method which aims to propose in this study is required of eliminating the ambiguity of the conventional method, minimal use of consumables, and streamlining for time saving. At the same time, sufficient accuracy is required with this method for ensuring safety in waste disposal. In future, it needs to consider time of reaching adsorption equilibrium, and dispersion and adsorption properties of bentonite by different localities and conditions.

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