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論文題目	Comparison of Cs Adsorption Characteristics of Soils in Japan and Indonesia (日本とインドネシアの土壌における Cs 吸着特性の比較)		
<p>This dissertation presents the comparison of Cs adsorption characteristics of soils in Japan and Indonesia.</p> <p>Chapter 1: Describes the background that motivates this research to be carried out, the objectives and the systematics of this research. This chapter also describes the study area which was selected in two different climatic area, that are in Takizawa Research Forest, Iwate, Japan which has temperate climate and in PUSPIPTEK Botanical Garden, Serpong, Indonesia which has tropical climate.</p> <p>Chapter 2: A detailed literature review related to the background theory and recent methodology regarding the adsorption characteristics in soil is presented in this chapter. This chapter explained the Radiocesium Interception Potential (RIP), as intrinsic soil parameter, that is used to measure the Frayed Edge Sites (FES) in clay mineral quantitatively. Furthermore, recent methods to describe the implication of competitive ion in the sorption of heavy metals in soils also presented in this chapter.</p> <p>Chapter 3: This chapter shows the detail of comparison results of analysing physico-chemical properties of soils in deciduous and coniferous forest from Iwate (Japan) and soil from Serpong (Indonesia). Climatic condition had made impact to the pedogenic process of soil. Thus, the composition of clay minerals, organic matter, inorganic and other soil particulate between Iwate soil from temperate region and Serpong from tropical region are very variable. High temperature and precipitation in Serpong area leads soil to faster desilication and thus, reducing the ability for cation sorption, which results low cationic exchange capacity (CEC). However, the surface area of this soil was higher than that of Iwate soils. Higher surface area in this soil also contribute to the distribution coefficient of Cs in soil. The heating soil treatment have a great impact to the surface area and caused removing of illitic clay mineral as well as organic matter. The composition of mineral and organic matter in soil have strong contribution to Cs adsorption than the type of vegetation of soil sampling area.</p> <p>Chapter 4: Describes the development of rapid RIP measurement method and its comparison with the conventional method. Development of RIP measurement was performed using Cs stable in the acidic solution (pH 4) with the bath temperature of 40°C. The result of new rapid RIP measurement was in the same range of magnitude order with the result from the conventional method. Using this new method, there is no significant difference in RIP value between 3 and 5 days of Cs contact time to the soil solution.</p>			

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Therefore, the RIP of soil could be estimated faster. The carrier effect of Cs in the RIP measurement was also investigated using radioactive Cs (^{134}Cs with stable carrier and mixture of ^{134}Cs , ^{136}Cs and ^{137}Cs without stable carrier) and using stable Cs (^{133}Cs). The results of RIP from all soil sample were varied from 27.27 to 522.66 mmol kg^{-1} .

Chapter 5: Explains the kinetic and equilibrium isotherm of Cs adsorption in soil. These are two important basics in order to understand adsorption process. The objective of this chapter is to obtain adsorptive capacity which is within the domain of the equilibria and to understand the diffusional resistance which is the domain of kinetics. The method of experiment is based on the previous chapter. The kinetic rates of Cs adsorption onto soil mineral were evaluated using pseudo-first order kinetic rate and pseudo-second order kinetic rate model. Cs sorption kinetic rate of all soil were better described by the pseudo-second order kinetic rate with larger coefficient of determination (R^2) of all soil samples than 0.99. It suggests that the considered sorption process takes place as chemisorption. Equilibrium isotherms of Cs sorption were analyzed using linier regression of Langmuir and Freundlich isotherm. The result shows that equilibrium isotherms were better described by Freundlich model with the coefficient of determination (R^2) of 0.947 and 0.981 for Iwate top-soil from coniferous and deciduous forest-floor respectively. These results suggest that the Cs adsorption onto soil is occurred on the heterogeneous adsorption surfaces.

Chapter 6: Describes the influence of competitive ion sorption in mineral soil to the RIP value. K^+ and NH_4^+ were used as competitive ions in this study. The adsorptions of Cs were better described by Freundlich isotherm. This might be due to relatively high concentration of Cs that used in the experiments. The effect of pH indicates that the trends of Cs adsorption and the distribution coefficient (K_D) increased linearly with the pH of solution. At around neutral pH (pH 6-8), the values of Cs adsorbed in soil and K_D value were within the range called the zero point of charge. In this range of pH, the adsorbed H^+ dissociates into solution and leaving the surface with no net charge. At lower pH values, the surface sites would become more positively charged due to dissolution of a portion of soil and thus the surface will express less attraction for adsorbing Cs^+ . The competition with hydrogen ions for exchange sites also caused decreases in sorption.

Chapter 7: Summarizes all the important findings and highlights the conclusion from the obtained results in Chapters 3, 4, 5, and 6. Furthermore, the recommendation for future research subjects are also given in this chapter.