이산화탄소 지중저장의 국내적용을 위한 위해성 평가 방안

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A risk assessment of CO_2 geological storage for domestic application

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In recent years, the importance of Carbon Capture and Storage (hereafter CCS) is growing bigger and bigger. The development and commercialization of CCS technology are concerned for reducing carbon dioxide(CO_2) emissions. For the most studies, the technology of CO_2 storage is known as the geological storage, ocean sequestration, mineral carbonation, industrial utilization, and so on. The geological storage is adjudged the most reasonable technology from economic and environmental aspects. Generally, the CO_2 geological storage is comprised of compression - transportation - drilling/injection - storage/management process. The critical problem is a leakage of CO_2 in all process. For resolving a leakage problem, it is necessary to predict and build a monitoring system. Those systems are proved safety of a leakage and received positive social perceptions of CO_2 geological storage. For those reasons, a risk assessment of CO_2 geological storage is required. A risk assessment is an estimated process of the possible effects when spilling CO_2. Although numerous studies of risk assessment have studied, it is incomplete to evaluate a risk and disaster quantitatively. The risk assessment will be developed for domestic application and safe CO_2 geological storage considering characteristics of Korea.

Key words : carbon dioxide(이산화탄소), geological storage(지중저장)risk assessment(위해성평가)

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바이오디젤의 산화가 배출가스에 미치는 영향

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The Effect of Biodiesel Oxidation Deterioration on Emission

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Biodiesel and biodiesel blend fuel are receiving increasing attention as alternative fuels for diesel engines without substantial modifications. Biodiesel fuels and blending have been widely studied and applied in diesel engine because of biodiesel's lower sulfur, lower aromatic hydrocarbon and higher oxygen content. Biodiesels have the potential to be oxidized in different condition. It has reported that oxidation deterioration of biodiesel is different in the condition of storage and oxidation causes chemical property change of methyl esters. Sunlight intensity, temperature, material of container and contact surface with oxygen are key dominant factors accelerating oxidation deterioration.

In this study, we chose temperature among key oxidation conditions and metal container filled with biodiesel was heated at about 110℃ for 10 days in order to accelerate oxidation deterioration. To better understand the effect of biodiesel blends on emission, steady state tests were conducted on a heavy duty diesel engine. The engine was fueled with Ultra Low Sulphur Diesel(ULSD), a blend of 10% and 20%(BD10, BD20) on volumetric basis, equipped with a common rail direct injection system and turbocharger, lives up to the requirements of EURO 3.

The experimental results show that the blend fuel of normal biodiesel with BD10 and BD20 increased NOx. The result of PM was similar to diesel fuel on BD10, but the result of PM on BD20 was increased about 63% more than its of diesel. The blend fuel of Oxidation biodiesel with BD10 and BD20 increased NOx as the results of normal biodiesel. But PM was all increased on BD10 and BD20. Especially THC was extremely increased when test fuel contains biodiesel about 140% more than its of diesel. Through this study, we knew that oxidation deterioration of biodiesel affects emission of diesel engine.

Key words : BD(Biodiesel, 바이오디젤), PM(Particulate Matter, 입자상물질), HDDE(Heavy Duty Diesel Engine, 대형디젤엔진), Oxidation(산화)

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