

List of Dissertation Abstract

(Risk Management and Environmental Sciences Safety Management Course)

Name	Supervisor	Title	Abstract
Yuta Kinoshita	Yasushi Oka	Entrainment of low density gas plume in the vicinity of the outflow source	<p>In this research, we did an experiment of helium plumes to grasp the entrainment characteristics of the source which exits low density gases. After we analyzed that experiment of helium with theoretical formula that was derived by Maarten van Reeuwijk et al, compared and considered entrainment coefficient α. Regarding the acceleration of centerline velocity and the behavior of the density around neighboring region, we were found that we could evaluate α appropriately because it expressed with theoretical formula of Richardson number and turbulence kinetic energy. As for the value α related to it, The helium outflowed was compressed by the density difference surrounding at a nozzle outlet height of 0.03m or less, It gradually raised in a laminar flow state without rolling up air. Our data suggested that the field that accelerated buoyancy around 0.07m in height and the transition point to the plume region.</p>
Hiroyuki AOKI	Atsumi MIYAKE	Hazard analysis for hydrogen filling station with a hydrogen production system using organic chemical hydride	<p>Risk analysis is a useful tool to identify hazards and undesirable accidents in a hydrogen filling station. However, characteristic hazards which are involved in a hydrogen filling station cannot be accurately identified because potential victims are not classified by the existing process safety method. The purpose of this study was to identify hazards which cause damage to users such as employees and drivers. The product safety analysis method was applied to the hydrogen filling station with a hydrogen production system using organic chemical hydride. From the examination results, I identified hazards affecting users.</p>
Masami Iizuka	Yasushi Oka	Plume property above a fire source with a simple harmonic oscillation in horizontal direction	<p>When a fire occurs on the ocean, the location of the fire source varies with time, unlike fire on land. Therefore, we aimed at grasping the temperature and speed characteristics of the hot air flow formed on the shaking fire source by simulating the fire source in a simple vibration in the horizontal direction. As a result, it was found that by correcting the heat generation rate with the moving speed of the fire source, it is possible to predict the temperature and speed on the perturbed fire source from the equation of the temperature / speed attenuation of the existing fire plume.</p>

Shinji OGAWA	Yasushi OKA	An investigation of cardiopulmonary load level of high load workers	Fire-fighters are working under severe condition. To avoid unsafe state and to continue stable fire-fighting activities, the evaluation of physical state of each fire-fighter is one of the most important issues. This evaluation of fire-fighters can provide useful information for stable fire-fighting activities by early replacement, support to manage organized and efficient activity. Four kinds of exercises were done by fire-fighters department city of Yokohama and assessment of fatigue condition was conducted based on changes in the biological information (electrocardiographic R-R interval, respiratory metabolism etc.) during these exercises.
Ryunosuke SATO	Tadahiro SHIBUTANI	Risk assessment in a hydrogen station using accident case analysis	Recently, as the momentum for hydrogen energy dissemination is increasing, development and social implementation of fuel cell vehicles are being promoted as one of them. One of the challenges for social implementation is the construction of a safe hydrogen station and safety assessment at hydrogen stations is necessary. In this study, a characteristic accident scenario for each use period of the hydrogen station was extracted by accident case analysis and the risk assessment for the accident scenario was performed.
Natsuko TAKAHASHI	Takeshi KOBAYASHI	The prediction of Chloroethylenes behavior in soil and consideration of the monitoring method.	Chloroethylene (VC) is a new controlled substances and is produced by biodegradation of tetrachloroethylene and trichloroethylene in groundwater. In this study, the behaviors of chloroethylenes in soil were predicted. Using experimental parameters of biodegradation and adsorption to soil, the each concentration changes of chloroethylenes were calculated. When groundwater was polluted by 100 times of the environment standard value for the groundwater of tetrachloroethylene, VC concentration in groundwater exceeded the environment standard value. However it was difficult to detect the VC using a surface soil gas investigation.
Mayuka TOMIZAWA	Takeshi KOBAYASHI	Construction of the Screening Methods for High Risk Concern Chemicals at Various Exposure in Indoor Environment	A variety of chemicals are contained to indoor products. There are concerns about exposure to various chemicals in indoor environment. The objective of this study is construction of the screening methods for high risk concern chemicals other than 13 chemicals which established guidance level of indoor air. We create the risk information database for 1697 chemicals and the risk screening methods for indoor chemicals in consideration 7 exposure route. According to the results, total 82 chemicals are determined high risk concern chemicals by either exposure route. For these 82 chemicals, the need of management was suggested.

<p>Atsuki NISHIMURA</p>	<p>Masahiko MATSUMIYA</p>	<p>Analysis of electrochemical behavior for Nd(III) in (Nd_{1/3}, K)TFSA low temperature molten salts</p>	<p>In this study, we focused on the development of environmental-friendly electrodeposition process using (Nd_{1/3}, K)TFSA low temperature molten salts. For this purpose, the electrochemical and nucleation behaviors of Nd(III) were investigated in this system. In particular, the complexation state and ionic conductivity of Nd(III), which are related with the electrochemical behaviors, were evaluated in this study. Finally, it was revealed that Nd metal was electrodeposited by potentiostatic electrodeposition using low temperature molten salts.</p>
<p>Yosuke NISHIWAKI</p>	<p>Mieko KUMASAKI</p>	<p>The study on hygroscopic deterioration and combustion change of the AP/Mg Fireworks</p>	<p>In fireworks, the effect of humidity on deterioration and combustion change wasn't known well. I investigated Ammonium perchlorate / Magnesium mixture which is used as fireworks and easy to deteriorate by moisture cause to reveal problem and prevention methods of hygroscopic deterioration in fireworks. The deterioration was measured and the mechanism was considered. The effect of the deterioration on combustion was studied. And the relationship between atmosphere of storage area and deterioration was measured and considered.</p>
<p>Keita Hitachi</p>	<p>Hideo Ohtani</p>	<p>Effects of sweat on combustion of fabrics under high pressure conditions</p>	<p>In recent years, from the perspective of effective use of land, the number of constructions which are taken place in a great depth underground space is increasing. Consequently occupational accidents due to burning of clothing occurs under high pressure like the construction site using the pneumatic caisson method. The objective of our work is to determine the effect of sweat on combustion of fabrics under high pressure. Fabrics with NaCl aqueous solution did not ignited at 0-4 atm (gauge pressure). Though smoldering became active in the presence of NaCl aqueous solution which contains NaCl on the same level with sweat, and at higher concentration of NaCl, NaCl acted like the flame retardant.</p>
<p>Takashi MAKI</p>	<p>Tadahiro SHIBUTANI</p>	<p>Acceleration of Whiskers Initiation due to Additional Element and Elucidation of the Mechanism</p>	<p>Since whiskers generated from the plating inside the electronic equipment cause a failure of the equipment, a technology for suppressing the occurrence has been demanded, but in recent years it is also expected to be used as an electrode material by intentionally generating it on the sample surface. In this study, by adding Cu and Ru to Sn plating, we observe the growth of defects and whiskers in a short period, calculate the volumetric change amount and growth rate of defects, and perform strain analysis by image correlation method, and examined its mechanism.</p>

Hitoshi MISONO	Naoya KASAI	Hazard analysis method in hydrogen refueling station by using physical modeling	Hazard analysis is indispensable to promote the safety hydrogen refueling station. In this research, we have succeeded to create a hazard analysis model of hydrogen refueling station by using physical modeling software. And the hazard of hydrogen refueling station parameters such as the amount of leakage, pressure, temperature, was obtained. By using the created model, we also proposed a method of efficiently evaluating the influence and importance of safety measures using statistical methods when multiple safety measures inside a station are fail.
Sena MURAKAMI	Masahiko MATSUMIYA	Analysis of solvation structure for extracted rare earth complexes with DGA ligands using spectroscopic methods and density functional theory	We have proposed the effectiveness of solvent extraction on the development of efficient recovery process for rare earth elements. In this study, solvation structure of diglycolamide (DGA) ligands, which extract rare earth ions effectively, was investigated by spectroscopic methods and density functional theory (DFT). As a result, stoichiometry and stability constant of DGA complexes were revealed by spectroscopic measurements. Moreover, bond length between the rare earth ion and the ligand, and electron density in DGA molecule were calculated by DFT and difference in stability of the complexes was discussed in this study.
Rika YAMAZOE	Hideo OHTANI	Study about the fire extinguishing performance of the dry chemicals containing ferrocene	Ferrocene is a flammable substance, but when it is decomposed, atoms of iron are released and attack to radicals and stop chain reactions. Currently, the ABC dry chemicals are used mainly. But, phosphorous including that has the crisis of exhaustion and price hikes. So I used ferrocene instead of phosphorous, and extinguished the fire. The dry chemicals containing ferrocene showed high fire extinguishing performance at low concentration and revival suppressant effect.