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## **ASLIBS2019**

3<sup>rd</sup> Asian Symposium on Laser Induced Breakdown Spectroscopy

### August 27-30, 2019 Jeju, Republic of Korea

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MARCAN HAARAS AVAN

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Abstract Due Date

**Early Registration** 

IMPORTANT DATES

**June 21,** 2019

**July 10,** 2019

**Conference Dates** 

**August 27-30,** 2019

# Program at a glance



Time	Tuesday 27		Time	Wednesday 28		Thursday 29	Time	Friday 30	
09:00 ~					I	Registration			
9:00 ~ 9:30	Opening Ceremony Session 1 – Fundamentals of LIBS(1) Chair : Zhe Wang		9:00	Session 5 – LIBS for Ocean & Geological applications Chair : Ronger Zheng				Session 9 – LIBS for biomedical(2) application & industrial(3) applications Chair : Yoshihiro Deguchi	
9:30 ~ 10:40				O-I-05	Yonghoon Lee		9:00 ~ 10:20	O-I-07	Sungho Jeong
	O-I-01 Tetsuo Sakka	Teteuo Sokka	0:40	O-16	Nasrullah Idris			O-I-08	Zhenzhen Wang
		Teisuo Sakka		O-17	Muliadi Ramli			0.36	Shishi I i
	O-01	Liang Gao		O-18	Jinjia Guo			0-30	Sdvizhenskii P.A.
	O-02	Qi Wang		O-19	Yuan Lu		10:20	0-37	Suvizikiiskii 1.1.
	O-03	Ye Tian		O-20	Weijie Xu		~ 10:40	Coffee break (20 minutes)	
10:40 ~ 11:00	Coffee break (20 minutes)		10:40 ~ 11:00	Coffee break (20 minutes)				Session 10 – LIBS for industrial applications(3) Chair : Zhenzhen Wang	
11:00 ~ 12:25	Session 2 – Fundamentals of LIBS(2) Chair : Tetsuo Sakka			Session 6 – Relevant technology for LIBS				O-38	Junho Yang
	O-I-02	Zhe Wang	11:00 ~ 12:00 12:00	Ch	air : Yonghoon Lee		10:40 ~ 11:55	O-39	Minchao Cui
				0-21	Shining Ma			O-40	Jihoon Ryu
	O-04	Lednev V.N.		0-23	Jackun jung			O-41	Lanxiang Sun
	O-05	Zhifeng Cui		0.25	Hashum Les			O-42	Ekta Srivastava
	O-06	Weidong Zhou		0-25	Hacouni Ecc		11:55		
	O-07	Yuqing Zhang				Excursion	~	Closing Ceremony	
12:25 ~ 13:40	Lunch		~ 13:30	Lunch					
13:40 ~ 15:05	Session 3 – LIBS for industrial applications(1) Chair : Jin Yu			Session 7 – Chemometrics & biomedical(1) applications Chair : Euiseok Hwang					
			-	O-26	Jiujiang Yan				
	O-I-03	Yoshihiro Deguchi	13:30 ~ 15:00	O-27	Chen Sun				
	O-08	Shunsuke Kashiwakura		O-28	Meirong Dong				
	O-09	Sehoon Jung		O-29	Zengqi Yue				
	O-10	Yuqing Zhang		O-30	Dacheng Zhang				
	0-11	Yonghwi Kim		0-31	Pravin Kumar Tiwari				
15:05 ~ 16:30	1 Coffee break & Poster Session		15:00 ~ 16:30	) Coffee break & Poster Session 0					
16:30 ~ 17:55	Session 4 – LIBS for industrial applications(2) Chair : Shunsuke Kashiwakura			Session 8 – LIBS for Energy & Nuclear applications Chair : Sungho Jeong					
	O-I-04	Jin Yu	16:30 ~ 17:55	O-I-06	Jonghyun Yoo	Banquet			
	O-12	Junwei Jia		O-32	Hongbin Ding				
	O-13	Sungho Shin		O-33	Cong Li				
	O-14	Sunhye Kim		O-34	Sehwan Park				
	O-15	Shunchun Yao		O-35	Ran Hai				

#### ASLIBS2019 3<sup>rd</sup> Asian Symposium on Laser Induced Breakdown Spectroscopy August 27<sup>th</sup>-30<sup>st</sup>, 2019, Jeju, Republic of Korea

Real-time monitoring of heavy metal components of fine dust air pollution using laser-induced breakdown spectroscopy and spark-induced breakdown spectroscopy

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#### Abstract:

South Korea is dealing with the "social disaster" being unleashed by air pollution, after record levels of fine dust regularly covers the country in recent years. Some of the major cities suffered high concentrations of dangerous PM 2.5 particles. To complement emergency measures to reduce such dust pollution, the elemental analysis of the toxicity related to heavy metal components must first be conducted.

A spark which is an electrical discharge by a high voltage at low current can produce the plasma breakdown when the applied voltage is higher than the ambient surrounding of the electrodes. When such spark-induced breakdown occurs, plasma is created, and the emitted light can be analyzed. In this study, LIBS (laser-induced breakdown spectroscopy) and SIBS (spark-induced breakdown spectroscopy) have been utilized to detect and analyze the elemental information on fine dust. In particular, the chemical information of heavy metal elements with respect to dust particle size, concentration, relative humidity, and temperature is examined using LIBS. Then, multiple band-pass filters that pass only the heavy metal wavelengths are utilized in a compact SIBS device. The algorithm that integrates the electrical signal expressed in time units is standardized based on the optimal LIBS gate delay for each element. Subsequently, the real-time monitoring device for the heavy metal concentration in fine dust is described.



Fig.1 Detection process for heavy metal components in fine dust using spark-induced plasma emission.