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HASIL PENILAIAN SEJAWAT SEBIDANG ATAU PEER REVIEW  
KARYA ILMIAH : PROSIDING**

Judul Karya Ilmiah : Development of site class and site coefficient maps of Semarang, Indonesia using field shear wave velocity data

Jumlah Penulis : 3 orang (Windu Partono, Masyur Irsyam, **Sri Prabandiyani Retno Wardani**)

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c. Kecukupan dan kemutakhiran data/informasi dan metodologi (30%)	9,00		8,40
d. Kelengkapan unsur dan kualitas terbitan /prosiding (30%)	9,00		9,00
<b>Total = (100%)</b>	<b>30,00</b>		<b>28,80</b>
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Informasi pada web tidak mencantumkan daftar reviewer, namun di web conference informasi sangat lengkap. Syarat 4 negara terpenuhi, dan penulis berasal dari Jepang, Malaysia, Saudi, Oman, namun sangat didominasi paper yang berasal dari Indonesia.

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Ruang lingkup terbatas pada daerah Semarang, namun metodologi penelitian dapat dikembangkan untuk wilayah lain dengan mudah. Paper tertulis dengan baik, dengan bahasa akademik memadai. Gambar tajam dan rapi.

**3. Kecukupan dan kemutakhiran data/informasi dan metodologi:**

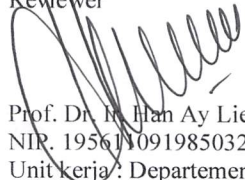
Penelitian mempunyai kebaruan dalam pendekatan numeris untuk kristalisasi zona dan peta gempa, namun karya ini merupakan kelanjutan dari tulisan-tulisan yang terpublikasi sebelumnya. Pustaka cukup.

**4. Kelengkapan unsur dan kualitas terbitan:**

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Semarang,  
Reviewer

10-2-2020

  
Prof. Dr. H. Han Ay Lie, M.Eng  
NIR. 195611091985032002  
Unit kerja: Departemen Teknik Sipil UNDIP

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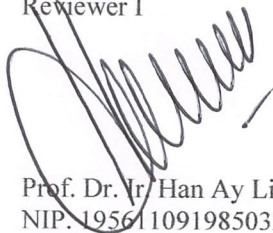
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c. Kecukupan dan kemutakhiran data/informasi dan metodologi (30%)	8,40	8,50	8,45
d. Kelengkapan unsur dan kualitas penerbit (30%)	9,00	9,00	9,00
<b>Total = (100%)</b>	<b>28,80</b>	<b>29,50</b>	<b>29,15</b>
<b>Nilai Pengusul = 40%/2 x 29,15 = 5,88</b>			

Reviewer I



Prof. Dr. Ir. Han Ay Lie, M.Eng.  
NIP. 195611091985032002

Unit kerja : Departemen Teknik Sipil FT UNDIP

Reviewer II



Prof. Dr. Ir. Sri Tadjono, MS.  
NIP. 195303091981031005

Unit kerja : Departemen Teknik Sipil FT UNDIP

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b. Ruang lingkup dan kedalaman pembahasan (30%)	9,00		9,00
c. Kecukupan dan kemutakhiran data/informasi dan metodologi (30%)	9,00		8,50
d. Kelengkapan unsur dan kualitas terbitan /prosiding (30%)	9,00		9,00
<b>Total = (100%)</b>	<b>30,00</b>		<b>29,50</b>
<b>Nilai Pengusul = 40% / 2 x 29,50 = 5,9</b>			

**Catatan Penilaian artikel oleh Reviewer :**

1. **Kesesuaian dan kelengkapan unsur isi prosiding:**  
Kelengkapan unsur isi prosiding lengkap.
2. **Ruang lingkup dan kedalaman pembahasan:**  
Ruang lingkup dan kedalaman pembahasan terdapat 3 pustaka yang disitasi dalam pembahasana.
3. **Kecukupan dan kemutakhiran data/informasi dan metodologi:**  
Kecukupan dan kemutakhiran data/informasi dan metodologi 1 dari 20 pustaka terbitan 5 tahun terakhir .
4. **Kelengkapan unsur dan kualitas terbitan:**  
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Semarang,  
Reviewer



Prof. Dr. Ir. Sri Tudjono, MS  
NIP. 195303091981031005  
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Volume 101, 9 March 2017, Article number 05010

1st Sriwijaya International Conference on Engineering, Science and Technology, SICEST 2016; Santika Hotel Bangka IslandBangka Island; Indonesia; 9 November 2016 through 10 November 2016; Code 126687

## Development of site class and site coefficient maps of Semarang, Indonesia using field shear wave velocity data (Conference Paper) (Open Access)

Partono, W.<sup>a</sup>, Irsyam, M.<sup>b</sup>, Prabandiyani Retno Wardani, S.<sup>a</sup>

<sup>a</sup>Civil Engineering Department, Diponegoro University, Semarang, 50275, Indonesia

<sup>b</sup>Civil Engineering Department, Bandung Institute of Technology, Bandung, 40132, Indonesia

### Abstract

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The new Indonesian National Code for seismic resistance design (SNI-03-1726-2012) issued recently utilizes seismic response spectra for the whole area of the country. Site class and site coefficient are two parameters needed for designing response spectra. Site class can be estimated using average standard penetration test (N-SPT), average shear wave velocity ( $V_s$ ) and average un-drained shear strength ( $S_u$ ) of top 30 meter soil deposit. Site coefficients can be predicted using probabilistic seismic hazard analysis (PSHA) by implementing total probability theorem. To perform PSHA,  $V_s30$  is a parameter needed for calculating ground motion at bedrock elevation. This paper presents the results of PSHA and site class analysis using  $V_s30$  values estimated based on N-SPT results collected from 265 boring locations in Semarang. Seismic data in a radius of 500 km from Semarang were collected for PSHA. Site class and site coefficient maps are then developed for the whole study area. © The Authors, published by EDP Sciences, 2017.

### SciVal Topic Prominence ⓘ

Topic: ground motion | seismic hazard | equations GMPes

Prominence percentile: 97.374 ⓘ

### Indexed keywords

Engineering controlled terms:

Acoustic wave velocity Earthquake engineering Seismic design Seismic response Seismology Shear strength Shear waves Wave propagation

Engineering uncontrolled terms

National codes Probabilistic seismic hazard analysis Response spectra Seismic resistance Shear wave velocity Site coefficient Standard penetration test Total probabilities

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Building evaluation using two components of acceleration time histories causes by shallow crustal fault earthquakes with maximum magnitude 7 Mw

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🔍 Partono, W.; Civil Engineering Department, Diponegoro University, Semarang, Indonesia;  
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# Atomistic-continuum hybrid analysis of dislocation behavior in spinodally decomposed Fe-Cr alloys

Akiyuki Takahashi<sup>1</sup> and Motoyasu Kanazawa<sup>1</sup>

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**Abstract.** In this study, we first present the molecular dynamics (MD) simulation of dislocation behavior in a spinodally decomposed Fe-Cr alloy. The MD simulation is used for exploring the nature of the interaction between a dislocation and the spinodal decomposition without any specific assumptions. In order to classify the interaction mechanism, dislocation dynamics (DD) simulations of the interaction between a dislocation and the spinodal decomposition are performed. In the simulations, we controlled the interaction mechanism by adding and removing the atomistic mechanism. The simulation results clearly illustrate that the atomistic mechanism can be negligible in determining the critical resolved shear stress (CRSS) of spinodally decomposed Fe-Cr alloys, and the internal stress generated by the lattice constant mismatch is a dominant mechanism. These findings are very useful for simplifying the analysis of the mechanism of material strength change due to the spinodal decomposition. Particularly in the analysis using the DD simulations, the required computational effort for simulating the dislocation behavior is greatly reduced by taking into account only the internal stress without the atomistic dislocation core influence.

## 1 Introduction

Duplex stainless steels consisting of ferrite and austenite phases have a high material strength, particularly the corrosion resistance, and are used as a material of primary coolant pipes in nuclear power plants. When the material is aged at temperatures in a range from 300 to 500°C, spinodal decomposition occurs in the ferrite phase, which causes an ultrafine phase separation mixing Fe-rich and Cr-rich phases. The phase separation leads to a material embrittlement and material strength change, and therefore, it is very important to understand the influence of the phase separation on the material strength for ensuring the reliability and integrity of structures. In order to investigate the material strength degeneration mechanism, an equation for the internal stress distribution arisen from the phase separation has been derived [1]. The equation can be used as a fundamental tool for investigating the influence of phase separation on the micro-scale material deformation mechanism, such as dislocation behavior. Kato conducted extensive theoretical studies on the interaction of the internal stress and dislocation and on the influence on the critical resolved shear stress (CRSS), which is a shear stress necessary for dislocations to initiate their motion in materials [2]. The information obtained by the studies is variable in clarifying the dislocation behavior in the internal stress field, and however, due to the

complexity and limitation of the theoretical approach to the problem, the information is limited for dislocations with a simple shape, even though the dislocation shape must be changed a lot by the interaction with the internal stress field. In addition, the influence of the spinodal decomposition on the material strength must be controlled by not only the internal stress field, and also the other type of elements associated with atomistic chemical energies. Thus, in order to fully understand the detailed mechanism of the material strength degeneration due to the spinodal decomposition, the understanding must cover very wide range from atomistic to continuum.

Owing to a remarkable development of dislocation dynamics (DD) simulation methodology, collective behavior and complex interactions of dislocations can be simulated and calculated using computers [3-5]. Up till now, the DD method has been successfully applied to various plasticity problems of metals and alloys. Takahashi and Ghoniem have developed a dislocation dynamics-based computational method for dislocation-precipitate interaction problems, and investigated the interaction of dislocations with precipitates in terms of elasticity [6]. Furthermore, they developed a hybrid atomistic-continuum method for investigation of dislocation cores [7-8]. The method provides us with a new opportunity to study the dislocation dynamics

\* Corresponding author: [takahash@rs.noda.tus.ac.jp](mailto:takahash@rs.noda.tus.ac.jp)

Open Access**Flexural behaviour of reinforced concrete beams with discrete steel – polypropylene fibres**

01020

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DOI: <https://doi.org/10.1051/mateconf/201710102001>[PDF \(173.2 KB\)](#) | [References](#) Open Access**Lactic acid production from date juice using *Lactobacillus casei* ATCC 393 in batch fermentation**

02002

Mujtahid Kaavessina, Fitriani Khanifatun and Saeed M. Alzahrani

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DOI: <https://doi.org/10.1051/mateconf/201710102002>[PDF \(1.032 MB\)](#) | [References](#) Open Access**Laboratory and pilot plant scale study on water dechlorination by medium pressure ultraviolet (UV) radiation** 02003

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DOI: <https://doi.org/10.1051/mateconf/201710102003>[PDF \(1.066 MB\)](#) | [References](#) Open Access**Combination of CaCO<sub>3</sub> and Ca(OH)<sub>2</sub> as agents for treatment acid mine drainage** 02004

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# Flexural behaviour of reinforced concrete beams with discrete steel – polypropylene fibres

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**Abstract.** This paper discusses the experimental results on the flexural test of concrete containing different proportions of steel fibre (SF) and polypropylene fibre (PPF). The flexural test was carried out under 4-point bending load and followed the relevant standards to FRC. Hooked-end deformed SF fibre with 60 mm length and fibrillated virgin PPF fibre with 19 mm length were used in this study. Meanwhile, the concrete was designed for high strength concrete of C60. The mixture included both single SF and PPF, and also the combination of both fibres; Control beam (PC), beam with 75%SF, beam with 75%SF + 25%PPF and beam with 25%PPF. The total fibre volume fraction ( $V_f$ ) was fixed at 1.5%. The experimental results show that the percentage proportion of combined SF-PPF at 75-25% had the best performance for its flexural capacity. Mixture with single PPF was also found not effective in delaying the onset of tension cracks and to increase the tensile strength of the concrete. Experimental result also shows beam with 75%SF + 25%PPF had their structural stiffness improved the most as compared with the others. For the compressive strength, beam with 75%SF + 25%PPF also revealed comparable performance with the control for high strength composite concrete.

## 1 Introduction

Plain concrete is weak in tension because it contains numerous micro cracks. These micro cracks propagate in the concrete matrix under constant applied load. Consequently, plain concrete members cannot sustain tensile stresses developed due to the applied force without the addition of reinforcing elements that are able to withstand these stresses. The addition of randomly distributed discrete fibres to the structural concrete increases its stiffness, ductility and load carrying capacity, while at the same time reduced crack development and propagation. According to the composite material theory and other findings [1], positive synergy of different fibres can complement each other to make new composite material with high performance and good economic benefits [2]–[4]. The use of two or more types of fibres in a suitable combination may potentially improve the overall properties of concrete and resulted in performance synergy [5]–[7]. In this study, steel fibre (SF) and polypropylene fibres (PPF) were combined to produce a hybrid system. Due to the lack of information on the ductile performance of hybrid fibre reinforced concrete composite (HyFRCC), an attempt was made to examine the ductility performance of HyFRCC beams. The

presence of one fibre enabled more effective utilization of the potential properties of the other fibre which resulted in improved flexural rigidity, and at the same time controlled the cracking development.

## 2 Related previous study

A study by [8] found that concrete mixed with two different lengths of SF possessed excellent resistance to air blast loading as compared with plain concrete. In their study, the total volume fraction was fixed at 1.5%, with the mixture containing 70% long and 30% short hooked-end type steel fibre.

The investigation indicates that the steel fiber reinforced concrete panel containing of 1.5% volume fraction gave the best performance under explosive loading. In another study by researcher [9], the concrete containing 0.5% volume fraction of SF not sufficient to provide adequate resistance against blast loading and 1% of the fibres shows the best performance and significant to reduced hair line cracks on the specimen. Further investigation using three different properties of carbon and polypropylene micro fibres added to steel fibres in a concrete mixture showed that macro fibres of steel with highly deformed geometry produced better hybrid than

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# Lactic acid production from date juice using *Lactobacillus casei* ATCC 393 in batch fermentation

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**Abstract.** *Lactobacillus casei* ATCC 393 was employed as a fermentative organism to convert sugars from date juice into lactic acid. Both glucose and fructose in date juice were fermented directly without any pre-treatment. The influences of supplementation of yeast extract and date juice concentration on some fermentation parameters, such as: cell growth rate, sugar conversion, productivity and yield, were investigated using this bacterium in batch fermentation. The results showed that by adding yeast extract about 20g/l in a date juice medium, the maximum specific growth rate of bacteria ( $\mu_m$ ) enhanced from 0.1229 to 0.1819 g/l. Meanwhile, increasing date juice concentration from 86.6942 to 158.9181 and 229.5367 g/l enhanced the  $\mu_m$  from 0.1819 to 0.2107 and 0.1916 g/l, respectively. It indicated that the optimum value for  $\mu_m$  is 0.2107 g/l in this concentration range. In the date juice concentration of 158.9181 g/l, the optimum lactic acid can be produced is 117.8301 g/l with yield of 92.685% for 48 h.

## 1 Introduction

Lactic acid, one of the most important organic acids, and its derivatives has been utilized in many applications such as in the food, textile, pharmaceutical, cosmetic and chemical industries [1]. Even, it became a prime candidate to be developed as a biodegradable polymer. Polymerization of lactic acid obtained poly (lactic acid) which has comparable mechanical properties, transparency, and UV light barrier to many conventional polymer (polystyrene, polyethylene, etc.) [2].

Recently, the global poly (lactic acid) market was expanding rapidly followed by increasing of lactic acid demand. Several factors stimulated this growth such as: sustainability of raw materials and government policy for bio-based and biodegradable product to tackle the waste problem. The global market of lactic acid is predicted to reach 1076.9 thousand tonnes in 2016 [3]. However, the global production of lactic acid is only 120 thousand tonnes in 2006 [4], thus the minimal production growth of lactic acid is 25% per years until 2016 to balance the gap between production and demand.

Lactic acid can be produced through chemical synthesis and microbial fermentation. The fermentation is an effective and attractive method due to produce lactic acid in high purity of one stereoisomer. The high purity of L(+) or D(-) lactic acid can be produced depending on a microbial strain and source of carbon (substrate) [4,5]. The economics of lactic acid fermentation is affected by many factors: raw material, purification, etc. The cost of the raw materials spends

approximately 60-80% of the total production cost [5]. Thus, it is important to explore some potential of agriculture product to get cheap and abundantly existing material. It can be summarized that there are three big groups of substrate: sugar, starchy material and lignocellulose.

As well known, sugar was reported as the preferred carbon sources. However, it is very expensive to use as the feedstock for lactic acid fermentation. Date is one of the promising biomass for lactic acid production without complicated pretreatment. Date contains between 70-80 wt% of fermentable sugars, mainly glucose and fructose in a balance ratio which can be consumed directly by lactic acid bacteria [6] Besides that, as reported by Al-Hooti et al. [7] and Al-Farsi et al. [8], date contains some minerals and low range of vitamins. In Arabic countries, a lot of dates are being wasted due to overproduction and poor handling low quality dates. Thus, production of lactic acid from dates is very attractive.

*Lactobacillus casei*, a genus of facultative anaerobic bacteria, is one of the bacteria that able to convert some sugars to lactic acid. During its growth, it consumes sugars as energy sources and converts to lactic acid. In this work, *Lactobacillus casei* ATCC 393 was employed to produce lactic acid from date juice. We investigated the effect of yeast extract as nitrogen source and initial sugar concentration on lactic acid production in batch fermentation.

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# Laboratory and pilot plant scale study on water dechlorination by medium pressure ultraviolet (UV) radiation

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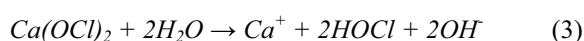
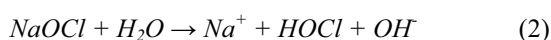
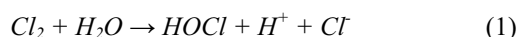
<sup>2</sup>Water Supply (Plants) Department, PUB, 228231 Scotts Road, Singapore

<sup>3</sup>Infrastructure Civil Department, Surbana Jurong Consultants Pte. Ltd, 150168 Bukit Merah, Singapore

**Abstract.** Ultra violet (UV) dechlorination was performed to eliminate residual chlorine as the byproducts of chlorination process. UV dechlorination utilizes photon energy generated by medium pressure (MP) UV lamp to produce powerful hydroxyls which in return break down chemical bond of the residual chlorine. This study was undertaken to investigate the removal of residual chlorine under a medium pressure UV radiation and evaluate the influence of UV fluence on chlorine removal efficiency based on both laboratory and plant scale experiments. In laboratory experiments, water samples were exposed to a UV collimated beam apparatus equipped with a medium pressure (MP) UV lamp over a specified exposure time. Chlorine concentrations were measured before and after UV exposure to calculate its chlorine removal efficiency. Results showed that chlorine residual decreased over time and the removal efficiency increased as the UV fluence increased. The maximum UV fluence applied in the laboratory experiments (513 mJ/cm<sup>2</sup>) resulted in less than 25% of total chlorine reduction. The field experiments were conducted at a waterworks in Singapore with total capacity of 22 l/s using an existing UV system. The plant scale studies supported laboratory findings with about 9% of chlorine removal efficiency. The chlorine decay rates (fluence-based first order constant) were also calculated.

## 1 Introduction

Chlorination remains as the most widely used method for disinfection of water and wastewater in the United State [1] and probably worldwide. Some advantages of this process include: (1) relatively low cost, (2) high efficiency, and (3) ease of use [2]. In this process, chlorine is commonly introduced in the forms of chlorine gas (Cl<sub>2</sub>), sodium hypochlorite (NaOCl), or calcium hypochlorite (Ca(OCl)<sub>2</sub>). When each of these chemical is added to water, rapid hydrolysis occurs to form hypochlorous acid, HOCl, which is further hydrolyzed to yield hypochlorite ion, OCl<sup>-</sup>, as shown in the reaction (1) through (4). Reaction (4) is strongly dependent on pH of the solution with equilibrium constant pK<sub>a</sub> = 7.5 (at 25°C) [3]. Both hypochlorous acid and hypochlorite ions are commonly referred to as “free chlorine residual” [2].



In the presence of ammonia, hypochlorous acid and hypochlorite ion react with the ammonia to form monochloramine (NH<sub>2</sub>Cl), dichloramine (NHCl<sub>2</sub>), and trichloramine (NCl<sub>3</sub>), which referred to as “combined chlorine residual”. Chlorination that converts all ammonia to either trichloramine or nitrogen gas is known as “break point chlorination”. After the break point, all ammonia is converted and thus the addition of chlorine resulted in formation of free chlorine residual.

Despite the extensive use of chlorination, chlorine residual is of concern to drinking water and wastewater treatment. Chlorine generates unpleasant odor and affects taste of drinks and liquids [4]. Recent studies suggest that residual chlorines may react further with dissolved organic matter by oxidation, addition and substitution reactions to form a range of DBPs (disinfection by products) such as the trihalomethanes (THMs), haloacetic acids (HAAs), and chlorite [5] that may pose unintended health hazards. Whilst for industrial water, chlorine residual could damage delicate process equipment such as reverse osmosis (RO) and deionization (DI) resin units and could accelerate corrosion of vessels, valves and piping.

In the case of wastewater treatment, toxicity of chlorine to aquatic life is another concern which had been studied extensively during the late 1970s and early 1980s. Further research on chlorine toxicity on early life

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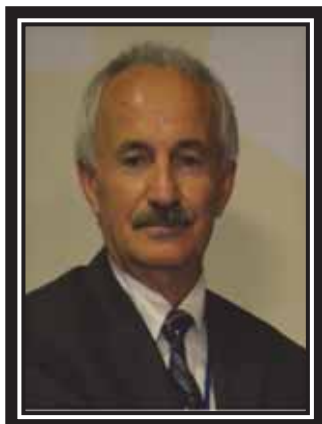
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**Advanced Nanomaterials for Water and  
Wastewater Treatment: From Strategic  
Fundamental Research to Industry  
Adoption**

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Water and wastewater treatment is known to be one of the most sustainable solutions to provide fresh and safe water for many water stressed communities and industrial sectors. Over the last decade, some concrete evidences indicate that the advances in advanced materials, particularly nanomaterials, have facilitated the next paradigm shift in the water and wastewater treatment processes. As the integration of nanotechnology with these processes is most likely to dominate the future research attention and the water treatment market, this presentation timely discusses the state-of-the-art overview on the enabling and cutting edge water and wastewater technology integrated with advanced nanomaterials in term of the technological needs and future perspective, which include the challenges and opportunities of nano-enabled water treatment processes. The key issues such as scale-up, economic competitiveness, potential environmental impacts and energy consumption are discussed. This presentation also aims to provide directions and guideline to the research community regarding the future outlook and roadmap of the application of nanotechnology to heighten the performance of the existing water and wastewater treatment processes in bench-scale and commercialization level. By taking all key aspects into account, the water community should reach a general consensus on a holistic technological strategy to make decision about the future direction of nano-enabled water and wastewater treatment scenario. It is crucial to identify the missing pieces and create effective linkages among important elements in order to embrace the revenue-based opportunities of this technology at its best time.

Keywords: advanced nanomaterials, water and wastewater treatment

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