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**ISPRAVKA: EKOLOŠKI RIZICI I RECIKLAŽA NANOMATERIJALA –
AKTUELNA PITANJA (vol 7, p.1, 2014)**

***CORRECTION: NANOMATERIALS ENVIRONMENTAL RISKS AND RECYCLING –
ACTUAL ISSUES (vol.7, p.1, 2014)***

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ISPRAVKA – Uredništvo časopisa "Reciklaža i održivi razvoj" je u dogovoru sa autorskim timom preglednog rada pod nazivom " Ekološki rizici i reciklaža nanomaterijala – aktuelna pitanja " (D. Živković, Lj. Balanović, A. Mitovski, N. Talijan, N. Štrbac, M. Sokić, D. Manasijević, D. Minić, V. Čosović), koji je publikovan u ovom časopisu vol.7 iz 2014. godine (str.1-8), donelo odluku da se zbog uočenog ozbiljnog previda (na osnovu provere CEON-a), koji se ogleda u neadekvatnom citiranju jedne reference, odnosno izostavljanju reference iz koje su korišćeni pojedini tekstualni navodi, kao i dupliranja pojedinih referenci, izvrši neophodna ispravka onih delova rada u kome pomenuti referentni izvor nije adekvatno naveden, kao i ispravke u listi referenci, a u skladu sa propisanim procedurom.

CORRECTION – Editorial board of the "Recycling and Sustainable Development" Journal in agreement with the authors of the article titled "Nanomaterials environmental risks and recycling - actual issues" (D. Zivkovic, Lj. Balanovic, A. Mitovski, N. Talijan, N. Strbac, M. Sokić, D. Manasijević, D. Minić, V. Čosović), which was published in this journal vol. 7 in 2014 (p.1-8), made the decision to do correction of article because of a perceived serious oversights (based on check out by CEON). Oversight is reflected in inadequate citing a reference, or omission of reference from which the text used by individual states, as well as the duplication of certain references. The necessary correction refers to the parts of the article which reference source is not adequately specified and updates the list of references, in accordance with prescribed procedure.

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U poglavlju "Introduction" izvršena je sledeća ispravka:

a) u pasusu, koji počinje sa: "The Greek word..." treba da stoji:

The word (or prefix) "nano" comes from the Greek language and means "dwarf", while this term also means a 10^{-9} decrease of size. Regarding the units of length, prefix nano refers to the billionth part of a meter (nm), being equal to 10\AA . Comparing to some well known, usual lengths, 1nm is 10^4 times smaller than average human hair diameter of about 50 microns. More, if nanoelement is compared to a basketball, it is almost as same as a basketball compared to the size of the Earth [1].

b) u pasusu, koji počinje sa: "Modern industrial..." treba da stoji:

Nanotechnology applications started to develop at industrial level in the first part of the last century. Firstly, it was used in photography, polymer industry, etc., although nanotechnologies origins go back to ancient times and old technologies in pottery making (the so-called polychrome lustre [2].

c) u pasusu, koji počinje sa: "Nanotechnology represents..." treba da stoji:

According to one of the definitions of nanotechnology, it represents "the design and manipulation of materials at the nanometer scale such that novel or enhanced properties emerge." This scientific area develops rapidly, giving various opportunities in different fields of knowledge and application [3-5]. Nowadays, nanotechnologies present the example of a new technology in expansion, which commercial products are becoming available to wider range of consumers in various social activities [6]. Nanotechnologies combine all steps in production of nanosized elements or so called nanomaterials (in further text – NMs) [7], merging the idea, research, creation, development, product management, and market activities. But, the most important features that NMs need to possess refer to safe usage and risk assessment, which society and governments insist on, in order to protect the environment, and from the human health standpoint [7].

d) u pasusu, koji počinje sa: "Risks of conventional..." treba da stoji:

Due to their "new and unique" characteristics, NMs differ in many cases from their conventional chemical equivalents, for which there are many well known regulations and legislatives governing their environmental and toxic risks. Therefore, the concerns connected to NMs wide usage, as well as the exposure to NMs by humans and the environment, raise [7]. That becomes an actual question, since the effects of the exposure to nanoparticles are not well known nowadays. Due to such uncertainties, many researches worldwide are going on aiming to define which effects nanoparticles can have on humans and environment, and to understand the mechanisms of their influence to ambience and potential risks [9,12,14-20].

U poglavlju "Nanomaterials definition and legislation" izvršena je sledeća ispravka u prva tri pasusa, gde treba da stoji respektivno:

Having in mind mentioned details on risk assessment regulations for nanomaterials, the most important is to define them properly. Several working definitions, as well as general recommendations, have been already published by some non-EU countries, although complete regulation sets are still missing [7,21,22]. Concerning the European Union, the Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR) of the European Commission has scientifically defined the term "nanomaterial" and published it in October 2011, based on a reference report by the European Commission Joint Research Centre (JRC) [7,23,24]

So, the European Commission states in the Recommendation (EU, 2011a) that [24]: "Nanomaterial means a natural, incidental or manufactured material containing particles, in an unbound state or as an aggregate or as an agglomerate and where, for 50% or more of the particles in the number size distribution, one or more external dimensions is in the size range 1 nm–100 nm. In specific cases and where warranted by concerns for the environment, health, safety or competitiveness the number size distribution threshold of 50% may be replaced by a threshold between 1 % and 50 %" [7,24,25]. The Commission also predicted an examination of the definition by December 2014, especially focusing on the rightness of the upper limit of 50% by the given definition.

The aim of the NM definition is significant not just for nanosized materials identification, but because of the fact that NMs are not automatically classified as a hazardous material (EU, 2011a) [24]. In addition, such NMs definition can be of use for further regulatory statements dealing with possible ecological risks, requesting additional data i.e. On the other hand, the materials which haven't been defined according to previously given determination, can still be allowed to show certain risks [7].

U poglavlju "Nanomaterials recycling" izvršena je sledeća ispravka u prva dva pasusa, gde treba da stoji respektivno:

Since newly produced nano-scale materials (especially metals) are highly valued, there is a strong interest in their recycling. The problem in potential NMs recovering, reusing or recharging – which could lead to a loss of valuable materials- arises if needed data for complete definition of some novel NMs are missing, so they could be considered as hazardous waste [27].

The OECD Chemicals Committee gave main issues regarding NMs recycling and determined the practices of OECD member countries in the field of nanomaterial safety [24,28]. The NMs which could be applied to recycling process include [29]: pure manufactured NMs (e.g. carbon nanotubes), nano byproducts, liquid

suspensions containing NMs, items contaminated with NMs, solid matrices with integrated NMs [28,29].

The potential methods for nanoparticles separation from the waste stream were investigated in order to their recycling [27]. The most of the investigated processes belong to common separation techniques, like centrifugation or solvent evaporation, but these techniques have high energy demands. The other applicable methods (magnetic fields, pH and thermo responsive materials, molecular antisolvents, or nanostructured colloidal solvents) are proven as successful and efficient NMs recycling methods [27,30]. But, new additional investigations of physico-chemical, characteristics of NMs have to be performed in order to achieve their effective recycling [27].

Takodje, prema ispravci referenca [29] u poslednjem pasusu ovog poglavlja postaje referenca [31].

U poglavlju "Nanowaste ecotoxicology and treatment" izvršena je sledeća korekcija u prvom, drugom, četvrtom i petom pasusu, gde treba da stoji, respektivno:

The acceptance of new technologies with insufficient knowledge about their potential health and safety impacts is not usual [32].

There are a lot of literature data on the influence of pollution on humans and environment, i.e. given in Refs. [32-36]. However, in spite of numerous research and investigations in this field, the perplexity on different questions about NMs still exists, although some answers were given in the scientific opinion produced in 2006 by the Scientific Committee on Emerging and Newly Identified Health Risks SCENIHR [37].

The public opinion is always very important when dealing with the problems of pollution and environment. Due to that fact, it is necessary to take into account the information given by the consumers in order to improve, if needed the product design of new technologies, in this case NMs [32].

Related to current tendencies and recommendations, nanowaste should be classified as hazardous waste and should be properly treated and stored by the users [39]. It means that NMs waste management has to be concerned and many NMs characteristics, such as: atmospheric dispersion, translocation to distant ecosystems, deposition in the surroundings of research, production plants, groundwater contamination etc. [32,40], must be taken as the priority and investigated further by LCA analysis. Therefore, a lot of various methods to solve mentioned ecological problems with NMs waste and recycle precious materials from it are being significantly considered [32,42,43].

Takodje, ispravlja se broj reference u nazivu Tabele 1. u ovom poglavlju – umesto [35] treba da stoji [15].

Ispravlja se naziv poglavlja "Nanomaterials vision for 2020" u "Future of nanomaterials", kao i tekst u ovom poglavlju sa unošenjem adekvatne reference:

Further, R&D in the field of nanotechnologies should be focused on the key points that include significant and continuous investments in fundamental research in nanotechnology with an emphasis on innovation and concrete commercial applications, generation of jobs and benefit for the society, and promotion of safety and public enrolment. It is expected that future areas of research will include self-assembly materials, energy efficiency in terms of creation, consumption and storage as well as tissue engineering in medicine, etc. [44]

Based on these set goals, it can be expected that by 2020 nanotechnology will be widely incorporated in practically on industrial areas, thus providing greater efficiency, productivity, sustainability and more job opportunities. Nevertheless, institutional guidance in research and development, education, industrial and medical applications is needed. [44]

Tekst u poglavlju "Conclusions" ispravljen je u skladu sa naknadno unetom izostavljenom referencom:

Nanomaterials represent relatively new class of materials which are still in the research and development phase, although they have already been widely used as products with proven commercial benefits. Recent research results in the field of nanomaterials are presented in this review paper, from the aspects which merge the idea, research, creation, development, application, product management, and recycling.

When talking about nanomaterials, despite all their benefits, quality and usefulness, the problem of environmental impact has to be mentioned. Nanomaterials, considering that they are made artificially, have the unwanted property that some of the harmful substances can be discharged into the environment. Nanomaterials and nanowaste have been discussed as potentially harmful material for the environment and human health, according to actual regulations and legislatives which govern NMs environmental and toxic risks. Due to lack of knowledge about the negative effects which nanowaste can cause, the prior research activities have to be pollution prevention and its reduction.

Having in mind significant financial funds in nanomaterials research and development, the period to come will give more detailed information and correct answers to numerous questions still awaiting in this field. Also, it can be expected that more and different technologies for recovery, reuse and recycling of nanomaterials will be given and presented to scientific public in the near future.

Zbog unošenja izostavljene reference, ispravlja se i redosled u prvobitnoj listi referenci, i to:

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