**1,3-propanediol Based Polyol Synthesis for Shape‑Controlled Monodispersed Silver Nanostructures**

**Abstract:** Polyol process has provided detailed insight for precise control of the shape of silver nanostructures. The shape of the nanostructures, in particular, is of key importance that show direct impact on target of interest through structure-function relationship because of their shape‑dependent optical and interfacial properties. In this regard, **however**, despite significant progress in shape control, polyol process *via* 1,3-propanediol has been explored only in short context. **Here we show that** how versatile 1,3-propanediaol-based polyol synthesis is in order to investigate the tunability of shapes of the silver nanostructures. Wide range of reaction parameter sets were applied in order to perform comprehensive study of the nanostructures. Type, strength and concentration of reducing agents as well as polyvinylpyrrolidone (PVP) contribute advanced effect for precise tuning in formation of final structures. In addition, not only strength of the reducing agents, but their chemical structure also playing pivotal role in controlling various shapes. **We found that** the high yield of monodispersed nanorods is the result from precise combination of mild reducing agent and PVP of moderate molecular weight at defined reaction temperature in 1,3-propanediol. Similarly, monodispersed nanocubes formation is dependent on PVP of high molecular weight in 1,3-propanediol. Furthermore, **our result suggested that** various salt solution in substitution of reducing agent support the growth in specific direction and allow controlling the shapes in well-defined manner that we have shown in our result. We applied layer-by-layer surface modification approach to nanorods and nanocubes, and we anticipate our materials (finding) can be useful for the next level application towards hybrid nanomaterials.

**Key Words:** Polyol Synthesis, Silver Nanostructure, Shape-Control, Nucleation and Growth, Surface modification

Title Word Allowed: 15------Counted: 9

Abstract Words Allowed: 150----------Counted: 255

This time abstract is little longer, so that you will have better detail about our work.

Hi Nikunj,

I wanted to introduce this by briefly saying what I personally love about the process of writing and editing. It is one of the most effective and permanent tools to communicate your thoughts with precision and beauty, and when this is done with clarity and impact, allows others to absorb them as you do yourself. For me, a written piece has many moving parts, and the task of editing scientific writing is to make sure each word is clear, efficient, and fits together with the rest of the piece so that reading it is a smooth and powerful experience. In short, I think that good scientific writing makes the work of reading as easy as possible with a touch of sophistication, so everyone can experience the data in its best form.

This means that you have an extremely valuable opportunity to shape the thinking of other people by making the decision to publish – Dr. Eisele has told me that you are an excellent researcher, and if you succeed in communicating your work well, the impact of the data and your passion for science will speak for itself. Here are my comments on the original and a sample of what I changed it into, which you do not have to agree with, as it includes extensive edits that may not completely encompass your vision. If we were having an in-person discussion we could change the abstract line by line with your more advanced scientific input, but I made do this time with only my own interpretation of what you are trying to say.

**Abstract:** Polyol process has provided detailed insight for precise control of the shape of silver nanostructures. The shape of the nanostructures, in particular, is of key importance that show direct impact on target of interest through structure-function relationship because of their shape‑dependent optical and interfacial properties. In this regard, **however**, despite significant progress in shape control, polyol process *via* 1,3-propanediol has been explored only in short context. **Here we show that** how versatile 1,3-propanediaol-based polyol synthesis is in order to investigate the tunability of shapes of the silver nanostructures. Wide range of reaction parameter sets were applied in order to perform comprehensive study of the nanostructures. Type, strength and concentration of reducing agents as well as polyvinylpyrrolidone (PVP) contribute advanced effect for precise tuning in formation of final structures. In addition, not only strength of the reducing agents, but their chemical structure also playing pivotal role in controlling various shapes. **We found that** the high yield of monodispersed nanorods is the result from precise combination of mild reducing agent and PVP of moderate molecular weight at defined reaction temperature in 1,3-propanediol. Similarly, monodispersed nanocubes formation is dependent on PVP of high molecular weight in 1,3-propanediol. Furthermore, **our result suggested that** various salt solution in substitution of reducing agent support the growth in specific direction and allow controlling the shapes in well-defined manner that we have shown in our result. We applied layer-by-layer surface modification approach to nanorods and nanocubes, and we anticipate our materials (finding) can be useful for the next level application towards hybrid nanomaterials.

**Modified Abstract (249 words):** Previous explorations of polyol synthesis have provided valuable insight into the precise control of the shape of silver nanostructures. Nanostructure shape, in particular, directly impacts the target of interest through the structure-function relationship, due to the shape-dependent optical and interfacial properties of nanostructures. **However**, despite significant progress in shape control, polyol process vis 1,3-propanediol has only been explored in short context. **Here, we demonstrate** the versatility of using 1,3-propanediol-based polyol synthesis in investigating the shape-tunability of silver nanostructures. In order to perform a comprehensive study of the nanostructures, we applied a wide range of reaction parameter sets as well as a layer-by-layer surface modification approach to nanorods and nanocubes. By adjusting the type, strength, and concentration of reducing agents as well as polyvinylpyrrolidone (PVP), it is possible to incorporate precise tuning in the formation of final structures, with advanced effect. Additionally, both the strength and chemical structure of the reducing agents play a pivotal role in controlling various nanostructure shapes. **We found that** aprecise combination of mild reducing agent and PVP of moderate molecular weight at a defined reaction temperature in 1,3-propanediol resulted in a high yield of monodispersed nanorods. Similarly, the formation of monodispersed nanocubes is dependent on using PVP of high molecular weight in 1,3-propanediol. Furthermore, **our results suggest that** substituting various salt solutions in the place of reducing agents ensues in structural growth in specific directions, allowing well-defined control over silver nanostructure shapes. We anticipate our findings will influence next level applications involving hybrid nanomaterials.