# Supporting Information

## Electrochemically synthesized silver phosphate coating on anodized aluminum with superior antibacterial properties

Henry Agbe*, Dilip Kumar Sarkar, X.-Grant Chen,

Department of Applied Science, Aluminum Research Center – REGAL, University of Québec at Chicoutimi, Chicoutimi, QC, Canada, G7H 2B1.*Corresponding author: henry.agbe@yahoo.co.uk

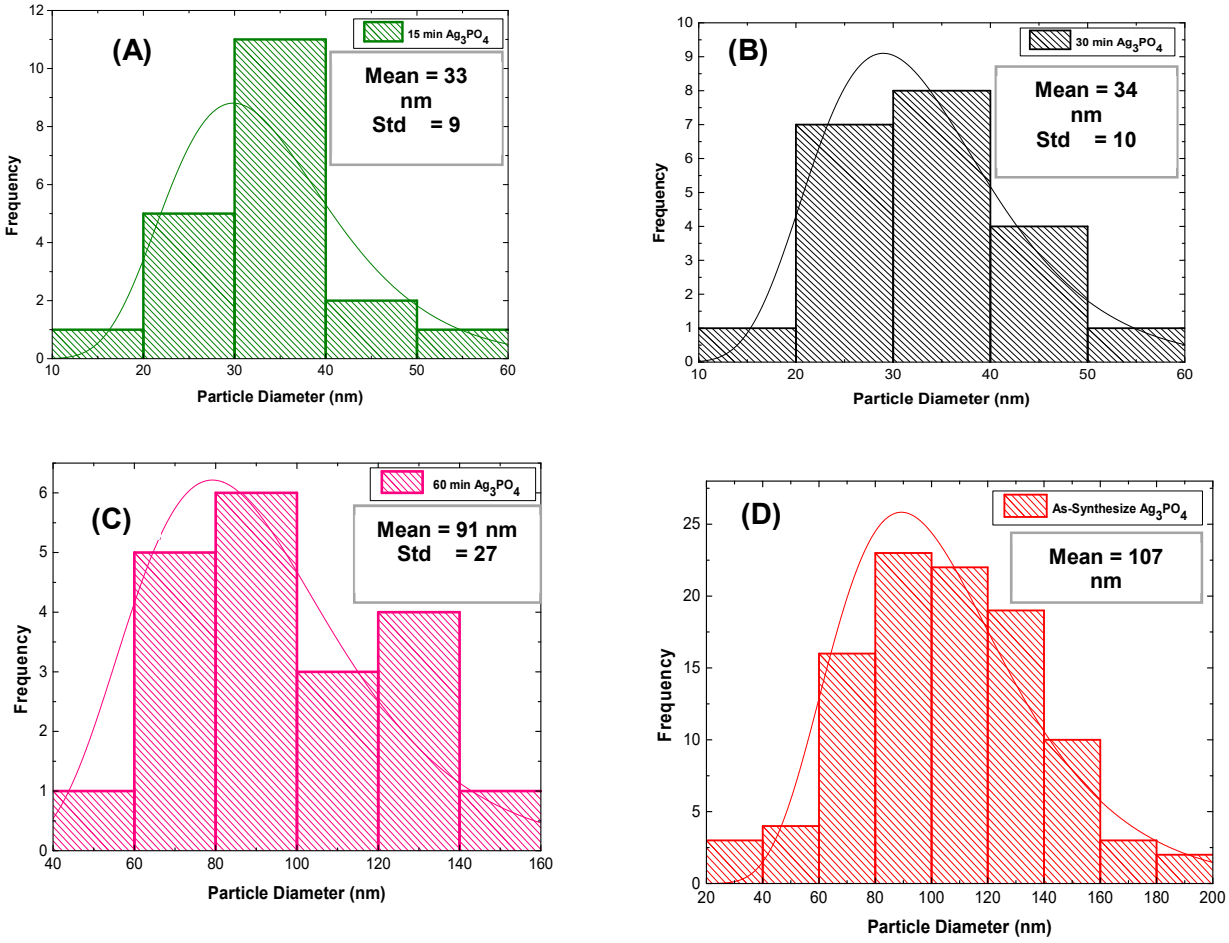

**Figure S1**. Particle size distributions for electrodeposition $Ag_3PO_4$ on AAO/Al using deposited silver for (A) 15 minutes, (B) 30 minutes; (C) 60 minutes; and (D)Powered $Ag_3PO_4$ nanoparticles.

**Table S1**. Calculated mass of silver and phosphate by electrodeposition process

| Deposition Time (min) | Calculated mass of Ag ($\mu g/cm^2$) | Calculated mass of $Ag_3PO_4$ ($\mu g/cm^2$) | Factor |
|---|---|---|---|
| 0 | $4.98 \times 10^7$ | $6.5 \times 10^7$ | |
| 15 | 62 | 80.6 | 1.30 |
| 30 | 233 | 302.9 | 1.30 |
| 60 | 527 | 685.1 | 1.30 |

**Table S2**. 1 % inactivation *E.coli* by $Ag_3PO_4$ under visible light, UV light and dark conditions

| Samples | *E.coli* Bacterium inactivation Rate (%) | | | |
|---|---|---|---|---|
| | Photocatalysis Time (min) | | | |
| | **0** | **15** | **30** | **60** |
| *E.coli* | *0* | *1.0* | *1.3* | *2.0* |
| *E.coli* + Visible Light | *0* | *7* | *10* | *13* |
| *E.coli* + UV Light | *0* | *14* | *15* | *20* |
| *E.coli* + Visible Light + $Ag_3PO_4$ | *16* | *100* | *100* | *100* |
| *E.coli* + Visible Light +$TiO_2$ | *8* | *44* | *46* | *48* |
| *E.coli* + UV Light + $Ag_3PO_4$ | *8* | *100* | *100* | *100* |
| *E.coli* + UV Light + $TiO_2$ | *5* | *70* | *81* | *85* |
| *E.coli* + $Ag_3PO_4$ (Dark) | *10* | *86* | *90* | *91* |
| *E.coli* + $TiO_2$ (Dark) | 4 | 29 | 35 | 36 |

**Table S3:** comparison of current study with existing reports in the literature.

| **$Ag_3PO_4$-Based Antibacterial Agent** | **Antibacterial Efficiency** | | **Reaction Time (min)** | **Wavelength (nm)** | **Mechanisms** | **Reference** |
|---|---|---|---|---|---|---|
| | S. A | E.coli | | | | |
| $Ag_3PO_4$/AAO/Al (Coating) | -<br>- | 100% | 60 | - | Photocatalysis | Current Study |
| $Ag_3PO_4$ (light) 5µg/mL – ZOI (mm) | -<br>- | 20 | 1440 | - | Photocatalysis/ Diffusion | Current Study |
| $Ag_3PO_4$ (dark) 5µg/mL- ZOI (mm) | | 15 | 1440 | - | Diffusion | Current Study |
| $Ag_3PO_4$ Suspension (Dark) | -<br>- | 91% | 60 | - | Ag+ ion leaching | Current Study |
| $Ag_3PO_4$ Suspension (visible-light) | -<br>- | 100% | 15 | - | Photocatalysis | Current Study |
| $Ag_3PO_4$ (visible-light) 125µg/mL- ZOI (mm) | 9.2<br>- | 10.00 | 1440 | - | Photocatalysis/ Diffusion | [1] |
| BU–$TiO_2$-X/$Ag_3PO_4$ (Suspension (visible light) | 99.85 %<br>- | 99.76% | 20 | 750-1000 | Photocatalysis | [2] |
| $Bi_2S_3$@$Ag_3PO_4$/Ti Suspension (visible light) | 99.45 %<br>- | 99.74% | 15 | 808 | Photocatalysis | [3] |
| *RGO/$MoS_2$/$Ag_3PO_4$ composite* | *97.8%*<br>- | *98.33%* | *10* | *660* | *Photocatalysis* | *[4]* |

| | | | | | | |
|---|---|---|---|---|---|---|
| *PDA/$Ag_3PO_4$/GO hybrid (coating)* | *99.66 %* | *99.53%* | *15* | *660* | *Photocatalysis* | *[5]* |

References:


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