

## Supporting Information

### Recent progress in surface-enhanced Raman scattering for the detection of chemical contaminants in water

Gustavo Bodelón<sup>1,2\*</sup> and Isabel Pastoriza-Santos<sup>1,2\*</sup>

<sup>1</sup> CINBIO, Universidade de Vigo, Vigo, Spain

<sup>2</sup> Galicia Sur Health Research Institute (IIS Galicia Sur), SERGAS-UVIGO, Vigo, Spain

**\* Correspondence:**

Dr. Gustavo Bodelón

[gbodelon@uvigo.es](mailto:gbodelon@uvigo.es)

Dr. Isabel Pastoriza-Santos

[pastoriza@uvigo.es](mailto:pastoriza@uvigo.es)

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Table 1. Summary of current approaches undertaken of different SERS sensing approaches for organic and inorganic pollutants in water.

| Contaminant  | SERS substrate  | Sensitivity                | Sample                   | Reference                                   |
|--|---|----------------------------|--------------------------|---|
| DDT  | SiO <sub>2</sub> capsules innerly doped with AuNPs    | 1.77 µg/L                  | RW                       | (Marino-Lopez, Sousa-Castillo et al. 2019)  |
| Thiabendazole  | Film-packaged Au/Ag bimetallic chip                   | 20 µg/L                    | DW <sup>s</sup>          | (Wang, Sun et al. 2019)                     |
| Thiram   | Core-shell polydopamine-Au beads                      | 2.4 µg/L                   | RW <sup>s</sup>          | (Chen, Zhu et al. 2018)                     |
| Thiram   | AgNPs-LC composites on polyamide filter               | 240.4 ng/L                 | RW <sup>s</sup>          | (Fateixa, Raposo et al. 2018)               |
| Crystal violet   | AgNPs doped polyamide membranes                       | 4.1 pg/L                   | ESW <sup>s</sup>         | (Fateixa, Nogueira et al. 2018)             |
| Metronidazole  | Ag nanorod arrays                                     | 10 mg/L                    | EW <sup>s</sup>          | (Han, Chen et al. 2014)                     |
| Ronidazole   |   | 50 mg/L                    |                          |   |
| Sulfamethoxazole                                       | Ag arrays in microfluidics                            | 0.56 µg/L                  | TW <sup>s</sup>          | (Patze, Huebner et al. 2017)                |
| Enrofloxacin   | Ag nanogratings                                       | 359.4 mg/L                 | AS                       | (Hong, de Albuquerque et al. 2017)          |
| Ciprofloxacin  |   | 331.3 mg/L                 |                          |   |
| Chloramphenicol  | AuNPs@Si substrates                                   | 4.8 pg/L                   | AS                       | (Fang, Li et al. 2019)                      |
| Enrofloxacin   | AuNPs over coverslip glass                            | 1.0 ng/L                   | AS                       | (de Albuquerque, Sobral-Filho et al. 2018)  |
| Ciprofloxacin  |   | 0.9 ng/L                   |                          |   |
| Tetracycline   | 3D AgNRs/O-g-C <sub>3</sub> N <sub>4</sub> substrates | 44.4 µg/L                  | AS                       | (Qu, Geng et al. 2019)                      |
| Rhodamine 6G   | AuNPs /SLIPSERS platform                              | 35.9 fg/L                  | AS                       | (Yang, Dai et al. 2016)                     |
| Phenylenediamine                                       | AuNPs/MIL-101 MOF                                     | 100 ng/L                   | RW, SW, SEW <sup>s</sup> | (Hu, Liao et al. 2014)                      |
| Acetamidrid  | AuNPs/MOFs  | 4.4-2.0 µg/L               | AS                       | (Cao, Hong et al. 2017)                     |
| Antracene/Pyrene/<br>Perylene/4-<br>Chlorobiphenyl     | AgNPs/ HKUST-1 MOF                                    | 3,5/0.03/0.7<br>/0.94 µg/L | AS                       | (Li, Cao et al. 2019)                       |
| Antracene/<br>Nitropyrene/Pyrene                       | pillar[5]arene-AuNPs thin films                       | 0.17/0.25<br>µg/L /2 ng/L  | AS                       | (Montes-Garcia, Gomez-Gonzalez et al. 2017) |
| Pyrene/fluoroanthene                                   | MIPs-AuNPs thin films                                 |                            | CW, SW                   | (Castro-Grijalba 2020)                      |
| Diethylhexylphthalate                                  | AgNPs aptasensor                                      | 3.1 ng/L                   | TW <sup>s</sup>          | (Tu, Garza et al. 2019)                     |
| ClO <sub>4</sub> <sup>-</sup>                          | Au ellipse dimer arrays                               | 26 µg/L                    | GW                       | (Jubb, Hatzinger et al. 2017)               |
| Hg <sup>2+</sup>                                       | Ag@polyaniline NPs                                    | 0.2 ng/L                   | AS                       | (Wang, Shen et al. 2013)                    |
| Hg <sup>2+</sup> , Cd <sup>2+</sup> , Pb <sup>2+</sup> | CNTs/CoFe <sub>2</sub> O <sub>4</sub> composite       | 1.0 µg/L                   | AS                       | (Shaban and Galaly 2016)                    |

|   |   |                 |                 |  |
|---|---|-----------------|-----------------|--|
| Hg <sup>2+</sup>                                  | 4,4'-Dipyridyl Au@Ag NPs                | 2.0 µg/L        | AS              | (Du, Liu et al. 2013)                      |
| Hg <sup>2+</sup>                                  | ZnO/Ag nanoarrays                       | 0.45 µg/L       | AS              | (Esmailzadeh Kandjani, Sabri et al. 2015)  |
| Hg <sup>2+</sup>                                  | Crown-ethers modified Au nanostructures | 3.35 µg/L       | TW <sup>S</sup> | (Sarfo, Sivanesan et al. 2017)             |
| Arsenic species                                   | Ag nanofilms                            | 0.1 µg/L        | AS              | (Yang, Liamtsau et al. 2019)               |
| Hg <sup>2+</sup> /CH <sub>3</sub> Hg <sup>+</sup> | AuNPs-doped polystyrene beads           | 0.1/1.5 µg/L    | AS              | (Guerrini, Rodriguez-Loureiro et al. 2014) |
| Hg <sup>2+</sup> /Ag <sup>+</sup>                 | Raman-encoded AuNP trimers              | 3.4/0.92 ng/L   | AS              | (Li, Xu et al. 2015)                       |
| Cd <sup>2+</sup> /PAHs                            | Polydopamine-coated Au NPs              | 1.1 /10-90 µg/L | AS              | (Du and Jing 2019)                         |
| Fluorosurfactant                                  | Ag colloids on graphene oxide           | 50 µg/L         | GW <sup>S</sup> | (Fang, Megharaj et al. 2016)               |

(<sup>S</sup>)-Spiked; RW-River Water; DW-Drinking Water; SW-sea water; CW-creek water; AS-Aqueous Solution; GW-Ground Water; ESW- Estuary Seawater; SEW-sewage water; EW-environmental water

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