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Study of light scattering by a monolayer of silica spheres ARTURO SANTOS GÓMEZ, ANA LILIA GONZÁLEZ RONQUILLO, Institute of Physics, Benemérita Universidad Autónoma de Puebla (IFUAP-BUAP) — Recent advances in the synthesis of silica (SiO_2) periodic structures at micro and nano scale have been led to numerous and diverse applications, for example, as a photonic material or SERS substrate. Model and numerical simulations of the electromagnetic response are crucial to understand the optical behaviour of these structures. In this work, we present numerical calculations of the optical efficiencies of light by an infinite bidimensional array of silica spheres, arranged in a closed packed configuration. The variables considered are: size of the spheres, angle of incidence, and refractive index of the surrounding medium. We have used the very well known Discrete Dipole Approximation to calculate the optical properties of the system. The diameter of the spheres is in the range from 200 nm to 600 nm, and we also have considered that the monolayer is embedded in different non absorbing media. The results show an optical bandgap associated with the periodicity of the structure. The bandgap is red-shifted when the size of the spheres is increased and its position depends on the refractive index of the surrounding medium and on the incident angle of light. Our results will provide a basis for future investigations.

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