

2D ASSEMBLIES OF SILICON NANOCRYSTALLITES PREPARED BY SOL-GEL METHOD FROM TRIETHOXYSilANE.

Jerôme Rouquette and Monique Pauthe

*Laboratoire de Physico-chimie de la Matière Condensée - Université de Montpellier II -
Case Courrier 084 - 34095 Montpellier cedex 5 - France*

Michel Ramonda

*Laboratoire d'Acoustique, d'Imagerie et de Nanophysique - Université de Montpellier II -
Case Courrier 082 - 34095 Montpellier cedex 5 - France*

Bernard Gil

*Groupe d'Etude des Semiconducteurs - Université de Montpellier II - Case Courrier 074 -
34095 Montpellier cedex 5 - France*

The sol-gel route using triethoxysilane as a precursor has been used to prepare films of Si nanocrystallites. These films were deposited on (001)-oriented silicon substrates either by spin coating deposition of a liquid phase that was further heat-treated under static vacuum (dots embedded in silica gel) or by vapour phase from the thermal decomposition under vacuum of the dried gels (uncapped dots). We address the structural characterisation of these samples and we find that a spontaneous orientation of the crystallites is obtained for heating treatment beyond 800°C if the dots are deposited in the vapour phase. The optical properties of dots embedded in silica gel reveal a strong red-orange photoluminescence due to carrier recombination at the dot surface, which is noticeably contaminated by oxygen and hydrogen.