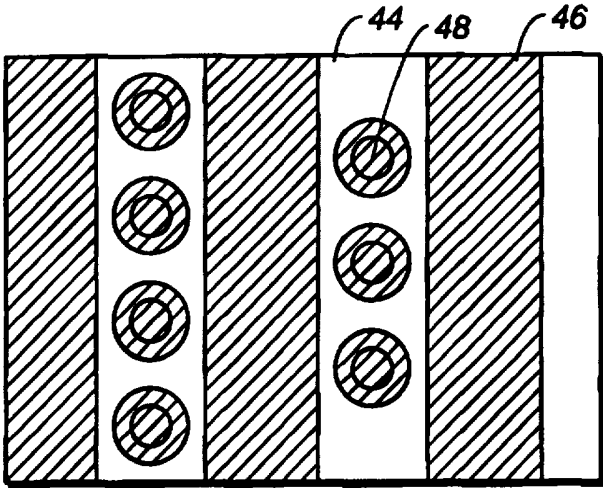


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(54) Title: QUANTUM DOT FABRICATION PROCESS USING STRAINED EPITAXIAL GROWTH (57) Abstract A process for production of self-assembled quantum dots is described which does not entail any processing steps before or after growth of the quantum dots. The process uses <i>in situ</i> formation of three dimensional islands which occurs during epitaxy of material with a different lattice parameter than the substrate. Further deposition of the substrate material then produces single or multiple buried two dimensional layers of randomly distributed or selectively positioned and substantially uniform sized quantum dots. These layers are free of defects and interface states. The lateral dot diameters vary between 140 to 300 Angstroms by appropriate choice of deposition parameters. 		

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 95/14713

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 H01L21/20

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 H01L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JOURNAL OF VACUUM SCIENCE AND TECHNOLOGY: PART B, vol. 12, no. 2, March 1994 - April 1994, NEW YORK US, pages 1063-1066, XP000442774 D. LEONARD ET AL.: "Molecular-beam epitaxy growth of quantum dots from strained coherent uniform islands of InGaAs on GaAs" see page 1063; figure 1 --- -/--	1-3,5-7, 9,11,16, 27,28, 30,34

☒ Further documents are listed in the continuation of box C.

☐ Patent family members are listed in annex.

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Date of the actual completion of the international search

14 May 1996

Date of mailing of the international search report

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	APPLIED PHYSICS LETTERS, vol. 63, no. 23, 6 December 1993, NEW YORK US, pages 3203-3205, XP002003049 D. LEONARD ET AL.: "Direct formation of quantum-sized dots from uniform coherent islands of InGaAs on GaAs surfaces" see the whole document ---	1-3,6,7, 9,11,16, 27,28, 30,34,39
X	PHYSICAL REVIEW LETTERS, vol. 66, no. 23, 10 June 1991, NEW YORK US, pages 3032-3035, XP000240081 C.W. SNYDER ET AL.: "Effect of strain on surface morphology in highly strained InGaAs films" cited in the application see the whole document ---	1,2,7,9, 11,16, 27,28, 30,34
X	APPLIED PHYSICS LETTERS, vol. 65, no. 11, 12 September 1994, NEW YORK US, pages 1421-1423, XP002003050 J. OSHINOWO ET AL.: "Highly uniform InGaAs/GaAs quantum dots (15 nm) by metalorganic chemical vapor deposition " see the whole document ---	1,6,7,9, 12,16, 27,28, 30,35
A	PHYSICAL REVIEW LETTERS, vol. 64, no. 16, 16 April 1990, NEW YORK US, pages 1943-1946, XP000205995 D.J. EAGLESHAM ET AL.: "Dislocation-free Stranski-Krastanow growth of Ge on Si(100)" cited in the application ---	
A	APPLIED PHYSICS LETTERS, vol. 57, no. 20, 12 November 1990, NEW YORK US, pages 2110-2112, XP002003051 S. GUHA ET AL.: "Onset of incoherency and defect introduction in the initial stages of molecular beam epitaxial growth of highly strained InxGal-xAs on GaAs(100)" cited in the application ---	
A	JOURNAL OF VACUUM SCIENCE AND TECHNOLOGY: PART B, vol. 12, no. 4, July 1994 - August 1994, NEW YORK US, pages 2516-2520, XP002003052 D. LEONARD ET AL.: "Structural and optical properties of self-assembled InGaAs quantum dots" -----	