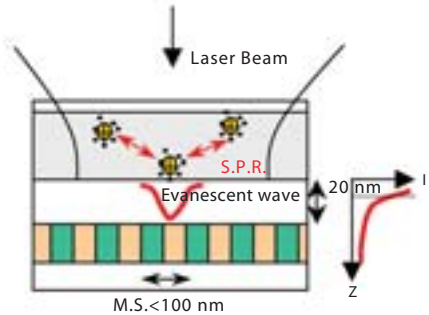
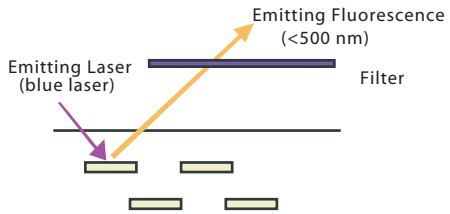
Super High Density Disc Technology
超高密度光碟片技術

ITRI is developing new mask layer materials and nano-grains high data-transfer rate recording materials in a super resolution near-field structure (Super-RENS). On combining with new fluorescence materials and multi-layer recording, large capacity increase may be achieved. With new mask materials giving rise to CNR~37 dB, capacity~67 GB, inorganic high-resolution write-once material with CNR~45 dB and capacity~67 GB, and multi-layer fluorescent recoding material with high resolution (Stoke shift > 100 nm at 405 nm laser) and high temperature stability (decomposition temperature > 200˚C), ITRI is well on its way to the interim goal of 100 GB storage density.

應用超解析近場光學（Super-RENS）效應開發新型遮罩層材料與奈米級晶粒化之高傳輸速率的記錄材料，及開發多層記錄技術用之新型螢光記錄材料，可達成記錄容量達100 GB以上之目標。目前應用新的遮罩層材料製作的碟片密度已達67 GB、訊噪比約37 dB，無機高解析一次記錄碟片密度達67 GB、 訊噪比約45 dB；多層螢光記錄材料以405奈米波長之雷射激發，可產生螢光波長偏移達100奈米之高解析度及分解溫度高於200˚C之熱穩定性。





Pit filled with Fluorescent Material

Super-RENS Disc

Developing new mask layer materials,

- Recording mark size ≤ 60 nm

Fluorescene Multi-layer Recording

New fluorescence recording materials (Oligomer's size<10 nm), Fine control of multi-layer thickness and multi-layer reflectivities (pit size<100 nm by different light wavelength),

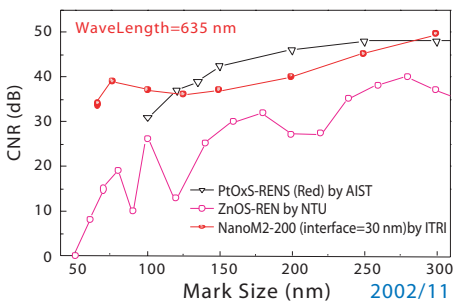
- Recording mark size ≤ 60 nm

Targets

- Developing an 100 GB prototype Super-RENS read-write system with combination of the new disk materials and driver technologies.
- Combining new fluorescence materials with multi-layer technology and nano molecular technology, 1st stage goal is 5-layer recording with capacity over 100 GB.

Results

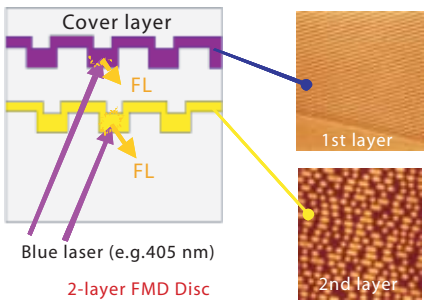
Super-RENS Materials



2002/11

- New mask layer material, CNR ≅ 37 dB (at λ = 635 nm) and min. pit length = 150 nm (~67 GB)
- High contrast inorganic write once materials, CNR ≅ 45 dB (at λ = 405 nm) and min. pit length = 150 nm (~67 GB)

Fluorescence Multi-layer Disc



2-layer FMD Disc

High fluorescence quantum efficiency, larger stoke's shift and high thermal stability (decomposition temperature is over 200˚C)

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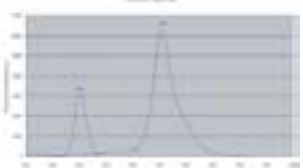

- Stoke shift > 100 nm
- excited by 405 nm laser

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