



# Exchange Coupled Composite Media for Heat Assisted Magnetic Recording

## Less Jitter

Heat-assisted magnetic recording (HAMR) is considered to be the most promising candidate for future information storage. HAMR uses a heating source to reduce the magnetic coercivity of the material during the write operation. This HAMR disk structure features an exchange coupling composite (ECC) comprised of a coupling layer (ECL) that separates a storage layer and a superparamagnetic write layer. The storage layer has a lower Curie temperature ( $T_c$ ) and a higher anisotropy than the respective ECL and write layers. The composite structure is optimized to reduce jitter for high density data storage by tuning the exchange coupling between the higher  $T_c$  write layer and the storage layer. As a result, this new structure has small jitter (approaching the grain size limit) and good tolerance of noise from  $T_c$  variance.

## Reduces Curie Temperature Dependence

HAMR information storage technology can be greatly affected by the  $T_c$  variance, as writing usually occurs at temperatures around  $T_c$  of the media. To control the noise caused by  $T_c$  variance and offer lower writing temperature, this new design introduces a superparamagnetic writing layer that decouples the recording process from long term storage. Advantages of this new composite media include a small transition jitter, insensitivity to the  $T_c$  variance of the storage layer, tunability and low writing temperature.

## BENEFITS AND FEATURES:

- Increased reliability and reduction of media noise in heat-assisted magnetic recording
- Thermal exchange coupled composite storage media
- Exchange coupling layer separates storage layer and write layer
- Tunable: can be optimized to reduce jitter by tuning exchange coupling between write layer and storage layer
- Small jitter (approaching the grain size limit)
- Good tolerance of / insensitivity to noise from  $T_c$  variance
- Superparamagnetic write layer with higher Curie temperature
- Low write temperature

## APPLICATIONS:

- Magnetic disk drives
- Heat-assisted magnetic recording

**Phase of Development** - Prototype development

## Researchers

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