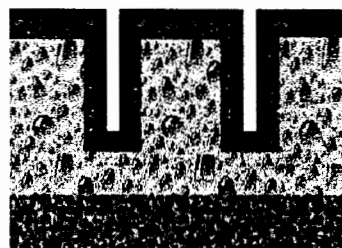


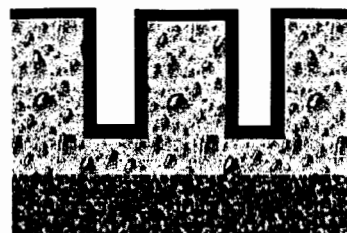
- 1 -

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Conventional

a



New approach

b

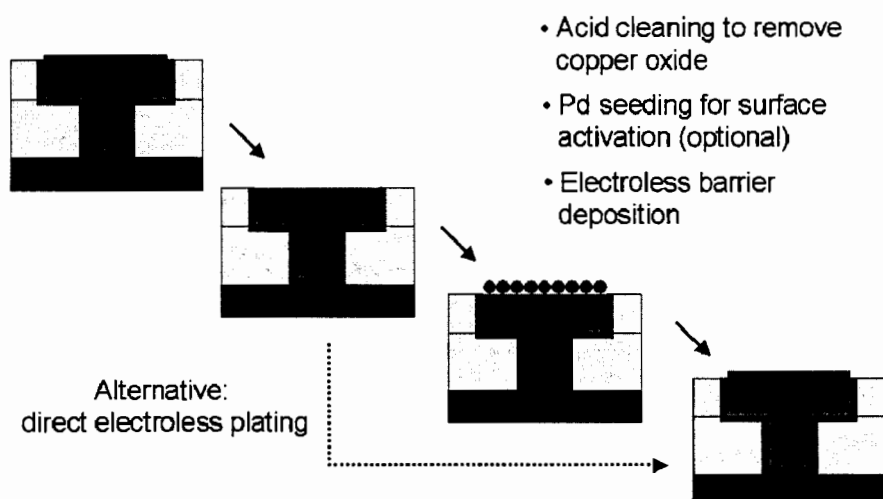
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Figure 1: Diagrammatic representation of conventional Cu metallisation method (a) and combined diffusion barrier and nucleation layer (b)

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Figure 2: Diagrammatic representation of the selective encapsulation process on Cu surfaces via Pd nuclei activation or by the direct route without the intermediate step of Pd nucleus activation including surface pretreatment

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- 2 -

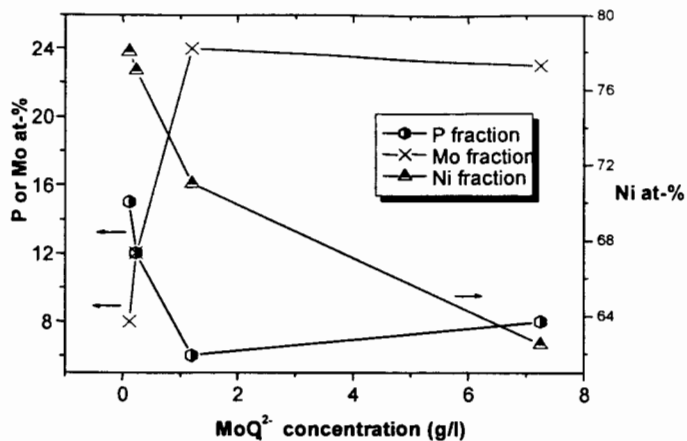
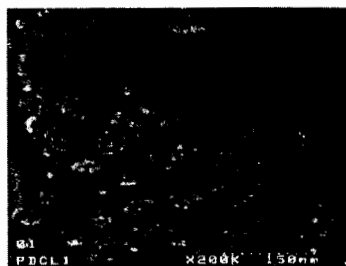
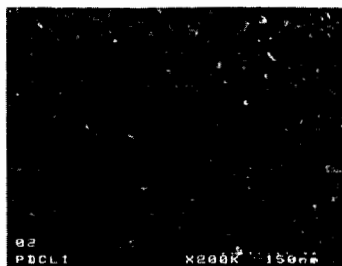


Figure 3: Effect of the concentration of sodium molybdate on the elemental composition of NiMoP three-component thin films

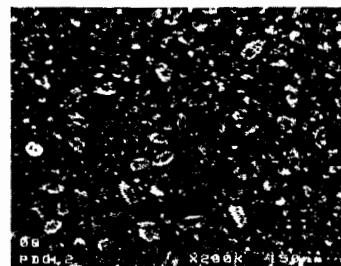
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(a)



(b)



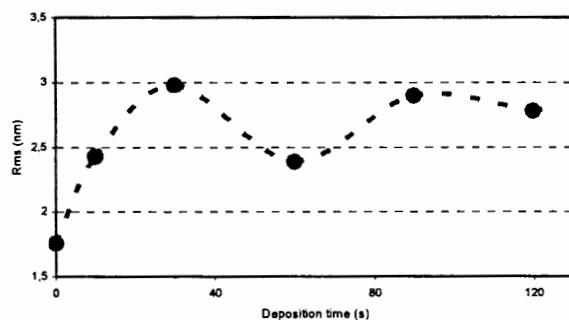
(c)

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Figure 4: Cu substrate without post-CMP cleaning (a), Cu substrate after cleaning for 2 minutes (b) and Cu substrate after cleaning for 2 minutes and Pd activation for 10 seconds

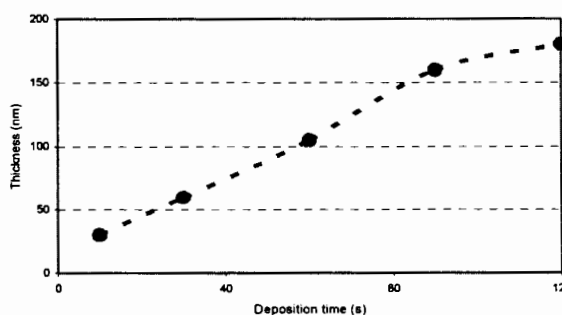
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(a)

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(b)

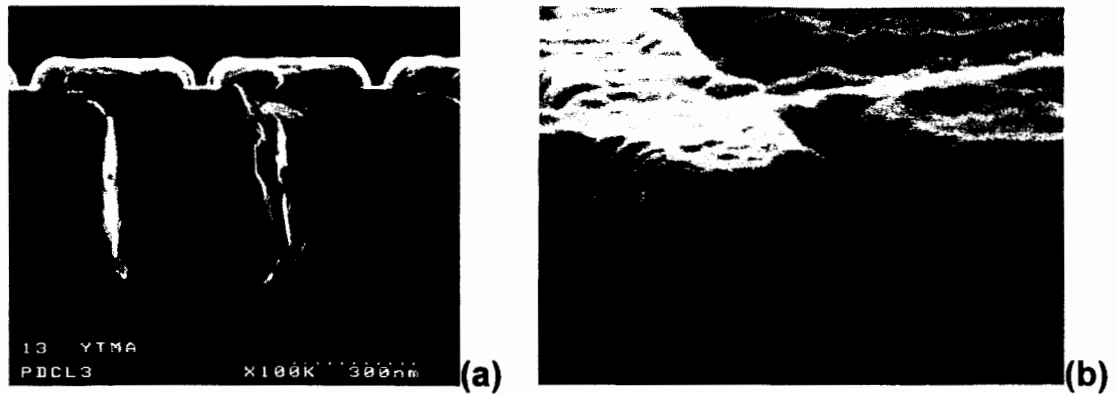
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Figure 5: Roughness (a) and thickness (b) as a function of the deposition time

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- 4 -

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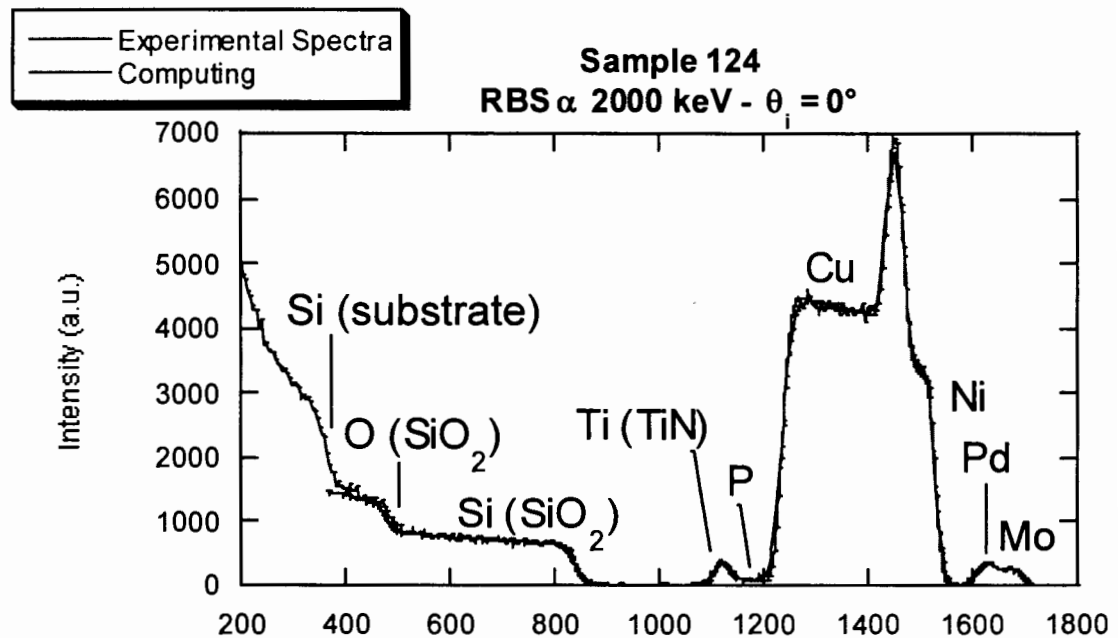


10 **Figure 6:** SEM photomicrographs of selectively encapsulated Cu damascene structures with Pd activation (a) and without Pd activation (b)

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30 **Figure 7:** Composition of the deposited NiMoP layer of base electrolyte 1 with addition of 3.75 ppm of DTDGS and 75 ppm of Brij 58

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