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(54) Title: ETCHING COMPOSITIONS

(57) Abstract: The present disclosure is directed to etching compositions that are useful for, e.g., selectively removing titanium nitride (TiN) from a semiconductor substrate without substantially forming a cobalt oxide hydroxide layer. The present disclosure is based on the unexpected discovery that certain etching compositions can selectively etch TiN without forming a CoOx hydroxide layer on a Co layer in the semiconductor device, thereby enabling a subsequent Co etch without delay.



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