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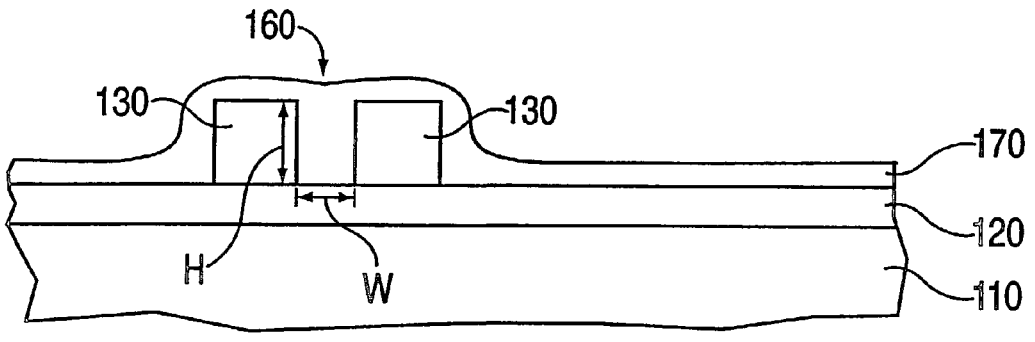
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(54) Title: A LOW-K PRE-METAL DIELECTRIC SEMICONDUCTOR STRUCTURE



(57) Abstract: A low-k pre-metal dielectric (PMD) structure on a semiconductor wafer and a method for making the PMD structure is described. The PMD structure includes a low-k dielectric film (170) that has good gap-filling characteristics, particularly where the gap (160) formed between features (130), such as gate stacks, has an aspect ratio greater than about 3. The method for forming the PMD structure uses a thermal sub-atmospheric CVD process that includes a carbon-containing organometallic precursor (260) such as TMCTS or OMCTS, an ozone-containing gas (270), and a source of dopants (280) for gettering alkali elements and for lowering the reflow temperature of the dielectric while attaining the desired low-k and gap-filling properties of the dielectric film (170). Phosphorous is a preferred dopant for gettering alkali elements such as sodium. Additional dopants for lowering the reflow temperature include, but are not limited to boron, germanium, arsenic, fluorine or combination thereof.

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