

Effects of ppb-Level Metal Impurities in Aqueous Potassium Hydroxide Solution on the Etching of Si{110} and {100}

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We investigated the etching characteristics of Si{110} and Si{100} planes in KOH solutions containing ppb-levels of the metal impurities, Ag, Al, Cr, Cu, Pb, Fe, Ni and Zn. It is found that the ppb-level of Cu in aqueous potassium hydroxide solution roughens both the Si{110} and {100} surfaces and the etch rate of Si{110} and {100} planes is affected by the ppb-level of Cu and Pb in KOH solutions. One can recognize no particular changes of etching characteristics in KOH solution containing ppb-levels of Ag, Al, Cr, Fe, Ni and Zn. The effects of Cu and Pb can be qualitatively explained by the interaction between metal ions and hydrogen gas generated during etching on the basis of oxidation-reduction potentials.