Electroplating with a polycarboxylate ether supressor

The present invention relates to a process for depositing a metal layer on a substrate by contacting the substrate with a metal plating bath comprising a metal ion source and a suppressor, and applying a current density to the substrate, where the suppressor is a polycarboxylate ether as described below. The invention further relates to a metal plating bath comprising a metal ion source and the suppressor which is a polycarboxylate ether; and to a use of the polycarboxylate ether in a metal plating bath for depositing a metal layer on a substrate.

Electroplating has several problems which need to be solved: The plating bath should have a high electrochemical stability because additives tend to degrade over time. This is important for an cost-effective electroplating process. The metal layer which is deposited on the substrate should have a smooth and uniform layer thickness, and it should have a high gloss. The electroplating should have good leveling properties, in particular provide substantially planar metal layer and filling features on the nanometer and on the micrometer scale without substantially forming defects.

In an aspect, there is provided a process for depositing a metal layer on a substrate by

a) contacting the substrate with a metal plating bath comprising a metal ion source and a suppressor, and
b) applying a current density to the substrate,

where the suppressor is a polycarboxylate ether obtainable by polymerizing a mixture of monomers comprising

(I) at least one ethylenically unsaturated monomer (I) which comprises at least one radical from the series carboxylic acid, carboxylic salt, carboxylic ester, carboxylic amide, carboxylic anhydride, and carboxylic imide; and
(II) at least one ethylenically unsaturated monomer (II) having a polyalkylene oxide radical.

In another aspect, there is provided a metal plating bath comprising a metal ion source and the suppressor which is a polycarboxylate ether as defined above.

In another aspect, there is provided a use of the supressor which is the polycarboxylate ether as defined above in a metal plating bath for depositing a metal layer on a substrate.

The **process** for depositing the metal layer on the substrate is usually **electroplating**. Typically, substrates are electroplated by immersing the substrate in the metal plating bath And contacting