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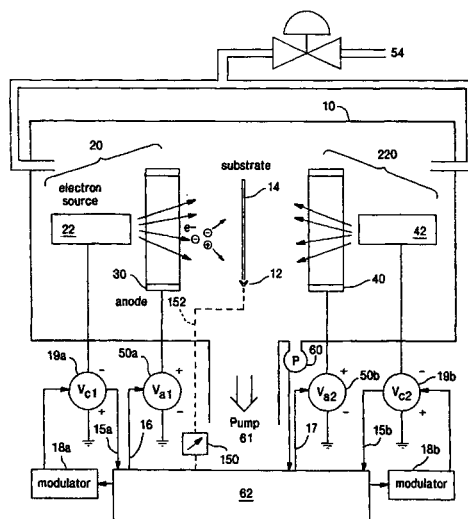
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(54) Title: PLASMA PROCESSING SYSTEM AND METHOD



(57) Abstract: A substrate processing system includes a processing chamber (10), an electrically floating substrate holder (12) positioned in the chamber, a gas source (54) for supplying a process gas to the chamber, at least one ion source (20) located in the chamber, and a power source (19b) for energizing the ion source by positively biasing the anode (40) and negatively biasing the cathode (22) in a train of pulses of selectably variable duty cycle and magnitude to maintain a selected time averaged current, the bias in each instance being relative to the chamber. The ion source (20) ionizes the process gas producing ions for processing a substrate disposed on the floating substrate holder (12) in the chamber. The floating substrate is biased in accord with the net charge thereon as controlled by the energetic electron flux. One embodiment includes two such ion sources (22, 42). In this case, the power source energizes the first and second anodes (30, 40) and the cathodes (22, 42) in a time multiplexed manner, such that only one of the first or second ion sources is energized at any time and interactions between ion sources are eliminated.