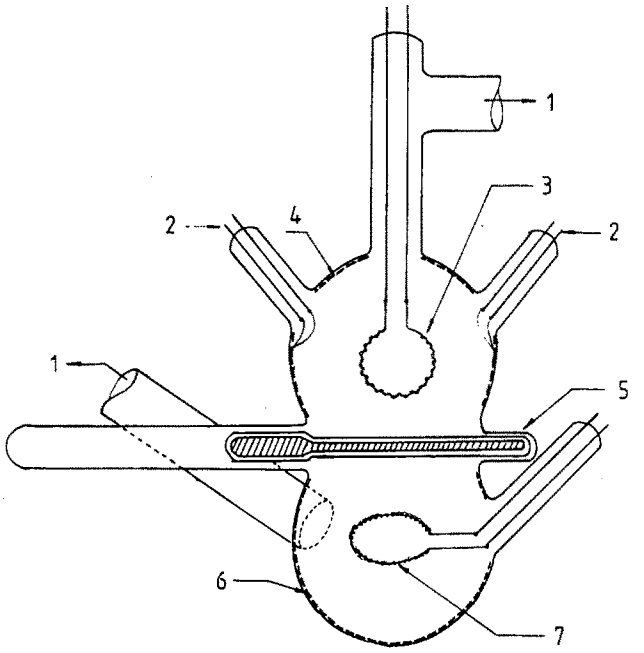

Figure 5. The cell for studies of atomic hydrogen emission from decomposing thin hydride films: 1-hydrogen inlet and outlet to diffusion pumps; 2-electrical connection for measuring the thin Pd film resistance; 3,7- tungsten filaments applied as heaters for deposition of Pd and Au films ,respectively; 4- thin Pd film; 5- shutter (iron slab covered with Pyrex glass); 6-thin Au film.

respectively. Another explanation for the first order process could be diffusion controlled PdH_x decomposition. To find whether atomic component is really present in the gas desorbing from PdH_x, an experiment was performed with application of thin Au film as a selective adsorbent for H from an ($H+H_2$) mixture [19--21]. A cell built of two hemispheres separated by a shutter was constructed (Fig.5). Thin Pd film was deposited on the wall of the upper hemisphere, and thin gold film on the wall of the lower hemisphere. Thin Au film was sintered to assure its inertness against H_2 adsorption [21]. The cell was maintained at 78K and $PdH_x(x = 0.8 \div 0.9)$ was formed in the static experiment measuring the amount of hydrogen consumed and the resistivity of thin film. The cell was then evacuated, and next the temperature of the upper hemisphere increased up to 320K, the shutter being open. Gas desorbing from PdH_x was impinging thin Au film maintained at 78K. Only H atoms could be adsorbed from the ($H+H_2$) mixture [20]. The presence of hydrogen deposit on gold was examined by means of the TDMS method. The results shown in Fig. 6 clearly indicate atomic hydrogen emission from the PdH_x surface. The amount of H atoms desorbing from

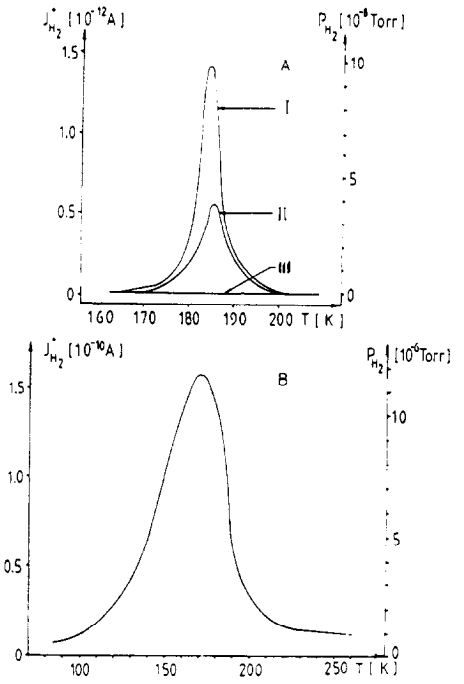

Figure 6. TDMS spectra for atomic hydrogen ddesorption from thin Au films. A.- The deposit was obtained due to atomic hydrogen emission from a decomposing thin PdH_x film obtained by H_2 interaction at 78K with: I.- unsintered thin Pd film of thickness 100 nm deposited at 78K; II.- thin Pd film of thickness 100 nm, deposited at 78K, sintered at 330K; III.- blind experiment: H_2 interacting with thin Au film. B.- The deposit was obtained due to atomic hydrogen interaction with thin sintered Au film. Atomic hydrogen was generated on hot tungsten filament.

hydride increases with the increasing of density of Pd surface atoms of low coordination number [19] present on unsintered thin films. Application of thin Cu film instead of gold showed that excited H_2 molecules are also emitted from a PdH_x surface at low temperature [22]. TDMS spectrum for small deposit of atomic hydrogen (H generated on hot W filament) on sintered thin Cu films consist of a single peak with maximum at 313K [22]. With increase of coverage the low temperature branch of the spectrum is modified due to $H_{ad} - H_{ad}$ dimers formation (Fig.7B). This leads to the broadenimg of the spectrum similarly as it was observed for H - Au system [20]. Interaction of sintered thin Cu films with gas desorbing from PdH_x leads to the TDMS spectrum which consists of two well separated peaks with maxima placed at 170K and 313K respectively (Fig.7A). We ascribe the low temperature peak to adsorption of the excited H_2 molecules, while the high temperature peak to adsorption of H atoms from (H + H_2) gas mixture emitted from