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## Research on High TCS project for Gobi Photovoltaic Development

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Since energy deficiency and global warming become most serious, it is anticipated global PV installment will reach 230 GW. China has urgent need to use PV to replace its coal-based (over 70%) energy structure. In last 4-5 years China becomes the world largest PV produce and user. Moreover, in China's plan, about half of the PV electricity are generated from distributed systems, the other half are from Gobi, which has an area of 1.3 million km<sup>2</sup> and ample sunshine. In 2012, 9 GW PV power stations are completed in Gobi. Currently the largest PV stations in the world are built in Gobi (about 20 GW). There are still many problems for power transmission from these power stations in deserts. Using HTS transmission lines is promising, while the current density is uniform only within a few meters (not km), which still limit its production yields, resulting in high sale price. Advance HTS technology are still under development for low cost, which are the determined factors for future applications.

It is critical to solve the nonuniform composition problem of the YBCO films by either PVD or CVD for better quality. The composition variations in YBCO affects its critical current density. Therefore, it is challenge to control the YBCO film composition. Also, the pinning issue is still unsolved, and its relationship to the film uniformity is still not understood. In this work, we succeeded in developing Raman scattering as a tool to identify the change of film compositions. We also correlate it with XPS results. Finally we succeed in developing a Metal Organic Sputtering, which adjust the specific MO flows to tune the film compositions. In this work we will report the composition finding using Raman shifts and its correlation with XPS, which will help improve the control of YBCO current density distributions.

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