

## ABSTRACT

The  $\beta$ -diketoboronates, (diphenylpropen-1,3-dialato)(oxalato)boron (**1**), (flavonolato)(oxalato)boron (**5**) and (flavonolato)(catecholato)boron (**6**), have the dye laser characteristics. Three other  $\beta$ -ketoboronates,  $(\text{RCOCHCOR}')(\text{O}_2\text{CCO}_2)\text{B}$  where ( $\text{R} = \text{R}' = \text{t-butyl}$  (**2**);  $\text{R} = \text{methyl}$ ,  $\text{R}' = \text{phenyl}$  (**3**) and  $\text{R} = \text{R}' = 2\text{-pyridyl}$  (**4**)) do not lase. The compounds were examined for their lasing characteristics, conversion efficiency and photostability. Higher conversion efficiency was observed for (**1**) doped PMMA in the form of a slab as compared to the thin-film PMMA host. A conversion efficiency of 29% was achieved when a slab of (**1**) in PMMA at concentration 3000ppm was pumped transversely by using Nd.:YAG Laser with 355nm output laser wavelength. The highest conversion efficiency of (**5**) and (**6**) obtained in this work were 4.0% and 3.1% respectively in thin-film PMMA, The higher bathochromic shift in compound (**5**) and (**6**) was the result of conjugation.

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$\beta$ -diketoboronata (difenolpropen-1,3-dialato)(oxalato)boron (1), (flavonolato)(oxalato)boron (5) dan (flavonolato)(katekolato)boron (6) mempunyai ciri-ciri laser. Tiga  $\beta$ -ketoboronata bahan yang lain, (RCOCHCOR')(O<sub>2</sub>CCO<sub>2</sub>)B where (R = R' = t-butil (2) ; R = metil, R' = fenolic (3) and R = R' = 2-piridil (4)) tidak menunjukkan aksi laser. Bahan-bahan itu telah diuji ciri-ciri laser, kecekapan pertukaran laser dan kestabilan laser. Kecekapan pertukaran laser yang lebih tinggi diperhatikan pada bahan (1) yang dirangkumkan dalam PMMA berbentuk kiub jika dibanding dengan yang berbentuk filem lipis. Kecekapan pertukaran pada 29% dapat dicapai dengan bahan (1) dalam PMMA yang berbentuk kiub pada kepekatan 3000ppm apabila teruja oleh laser Nd:YAG dengan 355nm panjang gelombang secara melintang. Kecekapan pertukaran yang tertinggi dicapai dalam penyelidikan ini bagi (5) dan (6) dalam PMMA yang berbentuk filem lipis adalah 4.0% dan 3.1% masing masing. Pengalihan bathochromic yang lebih tinggi dalam (5) dan (6) adalah disebabkan oleh konjugasi bahan itu.